5 DEMOLITION AND CONSTRUCTION ENVIRONMENTAL MANAGEMENT

Introduction

5.1 This chapter of the ES describes the demolition and construction programme and the key works that would be undertaken during the demolition and construction stage of the proposed development. In addition, the chapter identifies the key activities of the works; the potential impacts associated with these activities; as well as the measures that form part of the proposed development to avoid, minimise and where not possible, to mitigate the magnitude of the potential impacts.

5.2 The information presented within this chapter has formed the basis of the demolition and construction assessments in ES Chapters 6-11 of ES Volume 1 and ES Volume 2 (2A and 2B) to predict the likely environmental effects.

5.3 Detailed construction method statements and specifications have not yet been prepared and the lead construction contractor (Main Contractor), sub-contractors and trade contractors have not yet been appointed to undertake the required works. However, it is possible to establish the potential impacts associated with the proposed development's demolition and construction works and to determine a framework for the management of these impacts to ensure there no significant environmental effects arise.

5.4 The framework which was developed for the proposed development as part of the iterative design process is set out within this chapter and would form the basis for a Construction Management Plan (CMP) to be implemented during the demolition and construction works. The framework has been developed in tandem with a draft CMP which accompanies the application as a separate document. A detailed CMP would be secured by means of an appropriately worded planning condition and would be prepared in advance of the demolition and construction works following the appointment of the key contractors. The detailed CMP would include a Construction Traffic Management Plan (CTMP), as well as a Site Waste Management Plan (SWMP).

5.5 The framework within this chapter has been prepared in accordance with standard best practice and regulatory requirements. It presents an outline of all the anticipated environmental issues and necessary management controls that would be covered within the CMP.

5.6 More specifically, the CMP would define relevant policies, legislative requirements, thresholds/limits, procedures, roles and responsibilities for the implementation of environmental and management controls throughout the duration of the works. The CMP would be discussed and agreed with the LBC in advance of works commencing on-site.

5.7 It is standard practice to allow the appointed contractor's substantial input into documents such as the CMP, CTMP and SWMP; however at this stage of planning, contractors have not yet been appointed and construction method statements have not yet been prepared. Nevertheless, the likely content of such documents can be predicted with a reasonable degree of certainty having regard to the standard requirements of LBC and the experience of the Applicant and project team in developments of this nature and scale. As such it is considered that the likely environmental effects are still capable of assessment in this ES.

Scope and Programme of Works

5.8 To enable assessment of likely environmental effects within this ES, an indicative, but feasible, programme has been developed by the Applicant based on a number of assumptions. These assumptions have been informed by an understanding of current and future projected market conditions, logistical arrangements, technical considerations and professional experience, all of which are considered to be reliable.

5.9 Given the scale of the proposed development, the current expectation is that the demolition and construction works would be phased over approximately 68 months (6 years) as presented in Table 5.1 and Figure 5.1. It is anticipated that works would commence in Q1 2019, with completion targeted for Q4 2024.

Table 5.1: Indicative Demolition and Construction Programme

Works	Start Date	Completion Date
Section 278 Works	Q1 2019	Q1 2020
PFS Parcel (temporary supermarket)		
Demolition and Enabling Works, Substructure and Tanks	Q1 2019	Q4 2019
Frame/Superstructure, Façade/Cladding and Fit Out	Q3 2019	Q3 2020
MS Parcel		
Demolition and Enabling Works	Q3 2020	Q1 2021
Substructure and Basement	Q3 2020	Q3 2022
Supermarket Structure to Podium	Q3 2021	Q4 2022
Block A Frame/Superstructure; Façade/Cladding; and Fit Out	Q4 2021	Q1 2024
Block B Frame/Superstructure; Façade/Cladding; and Fit Out	Q3 2021	Q3 2023
Block C Frame/Superstructure; Façade/Cladding; and Fit Out	Q2 2021	Q1 2023
Block D Frame/Superstructure; Façade/Cladding; and Fit Out	Q1 2023	Q4 2024
Block E1 Frame/Superstructure; Façade/Cladding; and Fit Out	Q3 2023	Q4 2024
Block E2 Frame/Superstructure; Façade/Cladding; and Fit Out	Q3 2023	Q4 2024
Block F Frame/Superstructure; Façade/Cladding; and Fit Out	Q3 2023	Q3 2024
PFS Parcel (new permanent PFS)		
Strip out temporary store, fit out of offices, fit out PFS	Q4 2022	Q2 2023
Total Programme	**Q1 2029**	**Q4 2024**

Line	Name	Duration	Start	Finish
1	**Development**	**368w 3d**	**14/11/17**	**06/12/24**
2	**Preconstruction**	**139w 2d**	**14/11/17**	**15/07/20**
3	**Overall Construction Period**	**298w 4d**	**18/03/19**	**06/12/24**
4	**PFS Site (Offices)**	**69w**	**18/03/19**	**19/08/20**
5	**Form PFS (petrol filling station)**	**194w 1d**	**29/04/19**	**05/05/23**
6	**Enabling Works & Demolition Main Site**	**23w**	**22/07/20**	**13/01/21**
7	**Basement & Substructure**	**103w**	**05/08/20**	**20/09/22**
8	**New Supermarket Construction**	**84w 1d**	**09/09/21**	**13/06/23**
9	**Residential Buildings**	**173w 4d**	**18/05/21**	**06/12/24**
10	**Block C**	**82w 1d**	**18/05/21**	**26/01/23**
11	**Block B**	**95w 2d**	**20/07/21**	**11/07/23**
12	**Block A**	**102w 4d**	**16/12/21**	**12/02/24**
13	**Block F**	**95w**	**16/09/22**	**04/09/24**
14	**Block D**	**78w**	**27/02/23**	**03/10/24**
15	**Block E1**	**70w 4d**	**03/07/23**	**06/12/24**
16	**Block E2**	**64w**	**18/07/23**	**05/11/24**
17	Private Sales 385 units @ 2 per wk	192w	23/11/20	26/07/24
18	**Tower Crane Durations - T 1 - 8**	**262w 2d**	**01/08/19**	**09/08/24**

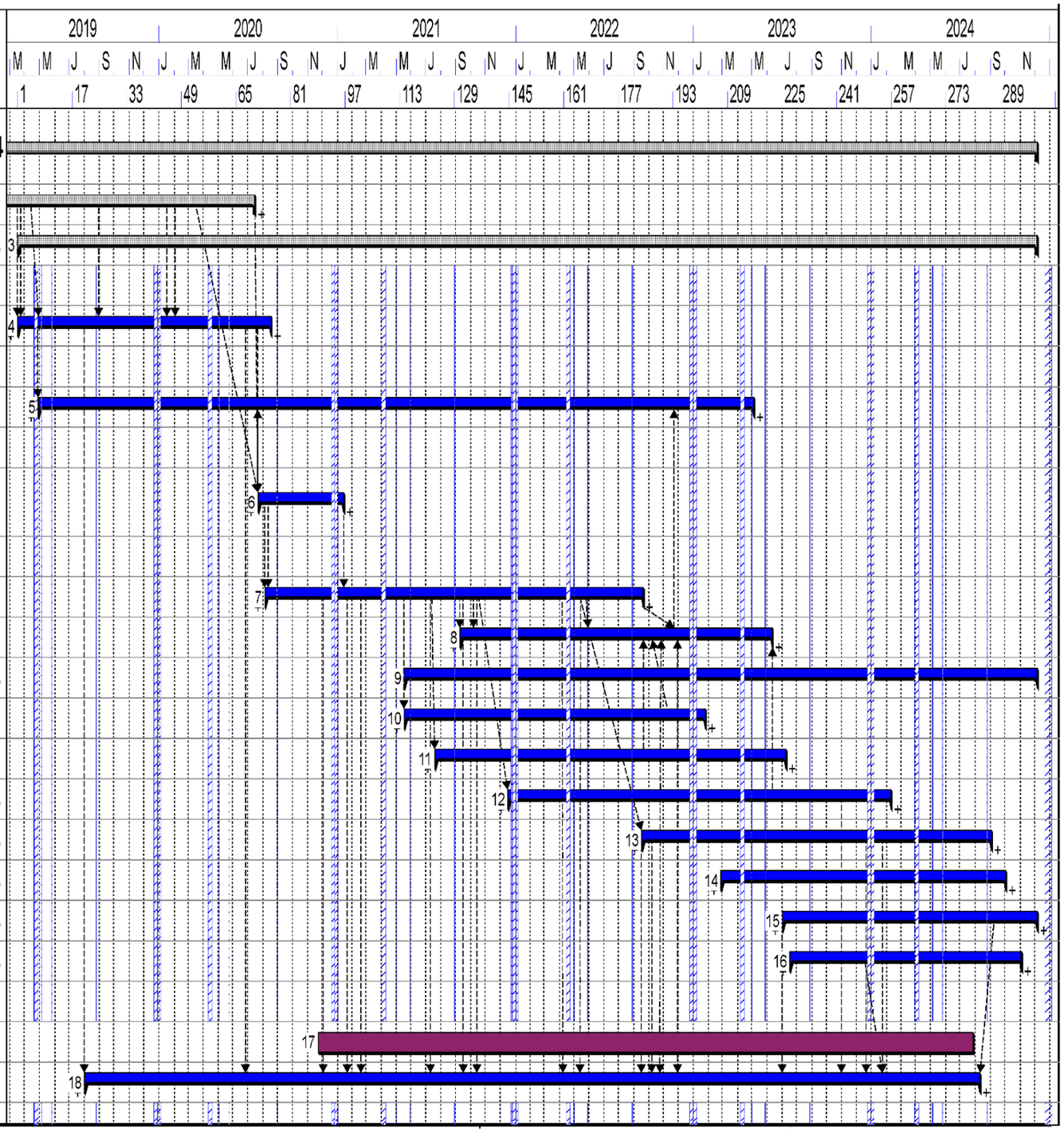

Figure 5.1: Indicative Demolition and Construction Programme

5.10 The first phase of the works would be to redevelop the PFS parcel to provide a temporary supermarket with commercial space above. Once this is operational the existing MS parcel would be redeveloped. When the new supermarket is completed on the MS parcel, the temporary store on the PFS parcel would be closed and adapted to form a new PFS.

5.11 As indicated in ES Chapter 2: EIA Approach and Methodology, the sequencing of activities on-site would be as follows:

- PFS parcel Enabling, Demolition, Construction of the PFS Block and Fit Out for temporary supermarket use at ground floor and offices above; MS parcel fully operational;
- PFS parcel operational as temporary supermarket and office use (on-site receptors); MS parcel Enabling, Demolition and Construction of Blocks A,B,C; and
- PFS parcel conversion of PFS Block from temporary supermarket to PFS; MS parcel supermarket operational, Blocks B and C near complete with Blocks A, D, E1, E2 and F under construction.

5.12 The temporary supermarket would operate at ground and first floor levels and provide 65 temporary car parking spaces. Figures 5.2 and 5.3 show the temporary supermarket layout.

Figure 5.2: Proposed PFS Block Temporary Ground Floor

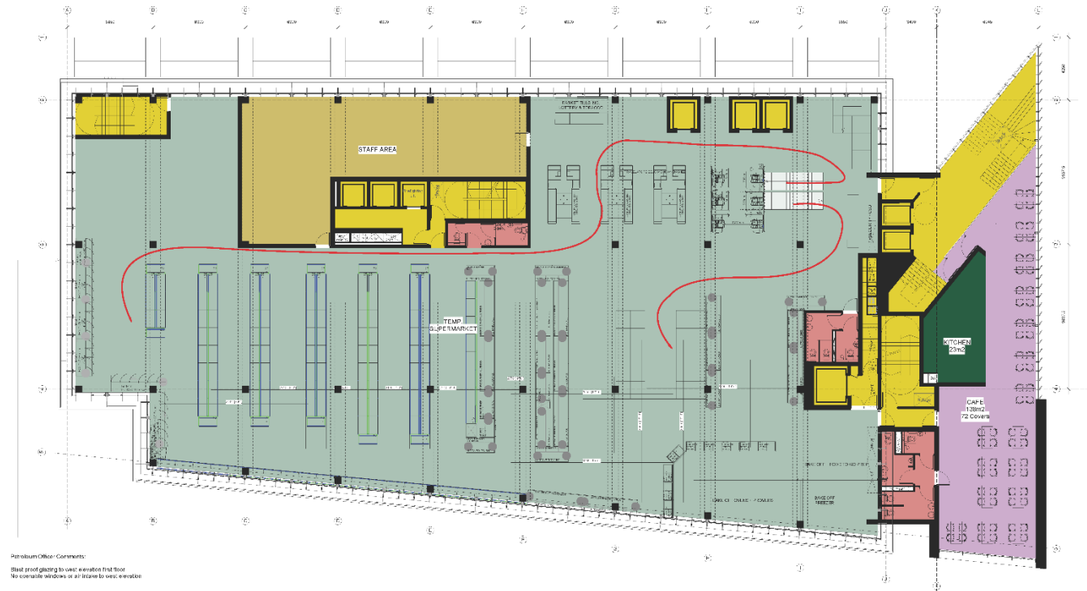

Figure 5.3: Proposed PFS Block Temporary First Floor

5.13 The detailed demolition and construction programme would be designed and managed to minimise disruption to local residents, the general public, and the environment.

Description of Works

Background

5.14 Early discussions would be held with LBC and other relevant statutory consultees, such as TfL, the EA, NE, HE, the GLA and HS2. These discussions would cover site logistics, management, access and egress and hoarding arrangements.

5.15 In addition to liaison with LBC, TfL and other statutory consultees, a key aspect of the successful management of the demolition and construction works would be the maintenance of good relations with the Site neighbours and the general public. The Applicant would consider other developments that may proceed at the same time and ensure close liaison with the other parties to co-ordinate and minimise potential impacts from the demolition and construction works.

Enabling and Site Preparation Works

5.16 Prior to the commencement of works on the PFS parcel and the MS parcel, the following investigations and activities would be undertaken:

- Review of the building registers for buildings to be demolished;
- Geotechnical and Site Investigations (SI) works;
- A programme of Archaeological Evaluation works;
- Survey of existing services;
- Preparation of tender documents and construction method statements; and

- Draining down and removal of pollutants/contaminants such as refrigeration gases, diesel fuel and engine oils, if any.

5.17 SI works would be required to inform the detailed structural design and to characterise ground conditions at the application site. An outline scheme of the SI works would be agreed with LBC in advance.

5.18 A Preliminary Risk Assessment undertaken of the application site indicates the potential for limited contamination to exist at the application site. In the event that contamination is identified following SI works, it would be dealt with by means of an appropriate Remediation Strategy to be agreed with the EA and LBC's Environmental Health Department.

5.19 In addition to the above, the locations of existing apparatus, curtailment locations, diversions and de-activation of existing electricity transformers at the application site would be confirmed with service companies. The curtailment of existing domestic services would be arranged, as well as, the cut-off of existing private drainage within the boundary of the application site. The protection and maintenance of any existing services would be carried out through liaison with the appropriate utility companies to ensure continuity of supply.

5.20 The scope of the archaeological mitigation strategy is likely to comprise maintaining watching briefs during SI works. The detail of the mitigation strategy would be described in a Written Scheme of Investigation (WSI) and would be agreed in consultation with LBC's archaeological advisor.

5.21 Concurrent with the above investigations, the following documents would be prepared:

- Pre-Tender Health and Safety Plan;
- Demolition Method Statement; and
- Tender Documents.

5.22 In addition, the following would be undertaken:

- Discharge of relevant planning conditions;
- Connection of temporary services to support on-site activities which would include power (if not completed by this time), sanitation, telecommunications, and gas (for site welfare etc.); and
- Phased disconnection and closing of drainage services to suit the programme of the demolition contract. Where necessary, service diversions would be carried out to ensure continuity of existing services prior to disconnection.

5.23 Prior to commencement of works, a 2.4 m timber hoarding would be erected along the boundaries of the two parcels as appropriate and suitable access would be arranged in consultation with LBC and TfL. Hoardings would be made secure, separating the general public from on-site activities. Areas within the application site would be designated for site offices, parking, waste management, material laydown, etc. and all signposted accordingly.

Demolition Works

5.24 Demolition works would comprise the removal of all existing buildings on-site together with any underground tanks (PFS parcel) and foundations.

5.25 Any asbestos identified from the Asbestos Register would be removed and disposed of by a fully licensed and qualified contractor before any other works are undertaken in accordance with the Control of Asbestos Regulations 2012[1], the Construction (Design and Management) Regulations 2007 and under a licence from the Health and Safety Executive. During the internal strip-out and removal of asbestos, protection would be put in place. This would consist of a scaffolding erected to the full height of the existing structures that would be fully clad with protective sheeting.

5.26 Building demolition would be undertaken using long reach excavators fitted with crushing attachments and where practically possible, machinery would be located as far as possible from sensitive receptors. This would ensure the safety of the operatives carrying out the demolition work, and help to keep noise and dust to a minimum.

5.27 The demolition works would require careful cutting of joints and removal of individual panels. Push over demolition may also be used. The most efficient method of demolition would be determined by the specialist demolition contractor and agreed with the main contractor prior to execution.

5.28 Once the buildings are reduced to a safe level, the resultant materials would be sorted for safe disposal and the hard standings broken up. All stored material and on-site skips would be covered to reduce fugitive dust emissions. Where this is not practically possible, the damping down of material would be undertaken. Where possible, crushing plant would be utilised to grade concrete and brick from the demolition works, and where possible stock piled for reuse within the proposed development. The level of re-use and recycling would be in accordance with the Applicant's sustainability targets.

5.29 Material loads removed from site following the demolition works would be covered and appropriate wheel washing facilities would be located at the site egress to prevent material spreading onto the road network. The road network would also be cleaned, when necessary, with the use of a street sweeper to remove any build-up of material of the road network.

5.30 The fuel in the tanks in the PFS parcel would be drained prior to enabling works. The demolition of the PFS would entail pre-commencement operations and the fuel tanks would be checked for any residual petrol residue. They would then be filled with water to minimise the risks of vapour related accidents.

5.31 Excavation would involve the removal of the tanks and the water would be tankered away to be disposed of following best practice. The open excavation would then be checked for signs of leaked fuel or other contamination and validation tests support a closure report.

Construction Works

Site Preparation

5.32 The phased works are likely to be undertaken by standard excavators and heavy goods vehicles (HGV) for the removal of material off-site.

5.33 The majority of the excavation works would be undertaken on the MS parcel.

5.34 If found at the application site, soil with contaminant concentrations exceeding the site acceptance criteria that has been agreed with the EA and LBC's Contaminated Land Officer, would be remediated in accordance with the agreed remediation strategy. The Applicant would explore opportunities for on-site remediation and re-use where possible of contaminated soils if and where found. Where on-site remediation or containment of contaminated soils is not feasible, soil would be disposed off-site at a landfill appropriate to the level of contamination present and waste classification determined from chemical analysis or Waste Acceptance Criteria testing as necessary, to ensure compliance to the Environmental Permitting Regulations.

5.35 Where the reuse of materials is considered appropriate on-site, the CL:AIRE Code of Practice: Definition of Waste would be referenced. Furthermore, to promote sustainable waste management, the 'Cluster approach' would also be considered to facilitate the remediation and/or development of a number of sites that may be located in relative close proximity to the application site and the potential for a fixed soil treatment facility, or 'soil hospital'. The reuse of both uncontaminated and contaminated (following remediation) materials would be encouraged as part of the proposed development and in accordance with relevant legislation.

[1] Health and Safety Executive, 2012. Health and Safety: Control of Asbestos Regulations. HMSO.

Piling and Substructure Works

5.36 The piling strategy for the proposed development is expected to consist of:

- A secant or contiguous piled wall where applicable; and
- Bearing piles throughout.

5.37 Prior to commencing sub-structure works, a piling platform would be prepared in accordance with the piling specialist's requirements.

5.38 The substructure to the PFS parcel is expected to consist of continuous flight auger (CFA) loadbearing piles. There is no basement planned on the PFS parcel; however the replacement of the underground fuel storage tanks would be undertaken as part of the substructure works at the PFS parcel.

5.39 The proposed supermarket on the MS parcel would be located below the existing ground level fronting directly onto Juniper Crescent approximately at the level of the road as it passes under the railway line. The substructure excavation would therefore, in places, be battered back at a self-supporting angle. Where space does not allow this, a secant or contiguous piled wall be constructed.

5.40 Approximately a quarter of the proposed development on the western extent of the MS parcel, would contain an additional second basement level. The substructure inside this is expected to consist of reinforced concrete slabs and walls. The wall piles would penetrate approximately 20 m below the basement level. The top of the piled wall would be restrained by suitable temporary works until the permanent slab is in place. The size of this basement would lend itself to the basement being excavated and load bearing piles being installed from the reduced basement level. This sequence would also take into account the need to maintain the integrity of the existing basement walls which are supporting the surrounding ground.

Superstructure

5.41 The PFS parcel would comprise a single commercial block located initially above a car park and store entrance which would then be converted back to a PFS.

5.42 The proposed development on the MS parcel would incorporate residential blocks of varying heights located over a new supermarket or parking which forms a lower ground floor level.

5.43 The main structure for the buildings would be *in-situ* reinforced concrete. The PFS is likely to have a reinforced concrete framed podium with an alternative framed superstructure over. At the MS parcel vertical walls (forming the core areas) would rise from the basement to provide the framed element of the buildings with lateral stability.

5.44 The construction of the reinforced concrete columns and walls would follow in sequence behind the walls on a floor by floor basis. Structural movement joints would be incorporated in accordance with the design details.

5.45 For the purposes of the EIA it is anticipated that concrete would be delivered via ready mix concrete trucks from surrounding batching plants. Concrete would normally be placed using a mobile pump.

5.46 Modern Methods of Construction (MMC) would be considered in the construction of the proposed development, subject to commercial and technical viability.

Envelope and Fit-Out Works

5.47 The supermarket and commercial areas would be fitted out to a 'shell and core' level with tenants or occupiers undertaking their own specific fit out of the areas.

5.48 The residential units and communal lobbies would be completely fitted out (less loose fixtures and fittings) ready for immediate occupation.

5.49 A phased sign off by the National House Building Council (NHBC) and subsequent handover of apartments would take place. The progress of each unit throughout the various construction stages through to completion would be monitored.

5.50 The façade to all blocks would consist of brick cladding with an insulated cavity and internal metal frame. Load bearing metal lintels would be provided over openings with a masonry support system on alternate floors which would be fixed back to the concrete structure.

Public Realm and Roads Works

Public Realm

5.51 In respect of the newly introduced, pedestrian friendly public realm, the following works would be undertaken on-site:

- Site levelling;
- Introduction of appropriate paved materials;
- Provision of street furniture, including litter bins, benches, signage and lighting; and
- Introduction of landscaping, including trees, and planting.

5.52 The following works would be undertaken off-site along Juniper Crescent:

- Re-materialisation of the road incorporating relocated pedestrian crossings, bus stops and enhanced public realm; and
- Realignment of the roundabout and access into the MS parcel.

S278 Works

5.53 The Section 278 works relating to the highway would provide the following:

- Pedestrian refuge crossing on Chalk Farm Road (west);
- Reconfiguration of the Chalk Farm Road/Juniper Crescent signalised junction to provide a single all movements junction in conjunction with removal of the signalised junction currently serving as the site exit; and
- Improvements to the configuration and safety of the cycle network along Chalk Farm Road and its cross roads.

Landscaping Works

5.54 Landscaping of the proposed development, including public amenity areas and perimeter public realm would be undertaken in accordance with the landscaping plans submitted to accompany the planning application, as presented within Chapter 4: Proposed Development Description, following completion of the key construction works.

Utilities and Service Installation

5.55 Utility connections for the proposed development would be procured from the statutory utility companies. They would install all necessary new services in the footpath as needed and coordination of these works would be managed to minimise the effects on all users of the highway. Services diversions and temporary closures would be put in place as necessary, notice being given to affected parties, through the usual consultation process.

Construction and Contracting Strategy

5.56 The Applicant and Main Contractor would be responsible for a number of sub-contractors and ultimately for the environmental management during the construction process.

5.57 Stringent contractual procedural and performance obligations would be placed on subcontractors under a clear management structure.

5.58 The Applicant's policies with regard to employment; training; health and safety; and customer care would be adhered to and would form the basis for demolition and construction procedures and behaviour.

Construction Employment

5.59 The construction of the proposed development would generate employment; a proportion of the construction employment is expected to be generated on-site, with the rest being elsewhere in the construction supply chain. It is estimated that approximately 51 net full-time equivalent construction jobs would be created within the LBC during the construction of the proposed development, once leakage and displacement have been taken into account. The construction works would have local benefits through construction training and targeting the local labour force. This would be achieved through employment and training initiatives.

5.60 The proposed development would aim to support construction apprenticeships during the demolition and construction stage.

5.61 Full details of construction employment are provided in ES Chapter 6: Socio-Economics.

Hours of Work

5.62 The core working hours during the demolition and construction stage would be as follows:

- 08:00 – 18:00 hours Weekdays;
- 08:00 – 13:00 hours Saturday; and
- No working on Sundays or Bank Holidays.

5.63 In order to maintain the above working hours, the Main Contractor may require, at certain times, a period of up to one hour before and after normal working hours, to undertake start and close down activities (this would not include works that are likely to exceed agreed maximum construction works noise levels).

5.64 Although working outside the stated hours would not normally be undertaken, it is possible that some deliveries may take place at night, and that certain works may have to be done during this period for safety or other considerations e.g. under Network Rail track possessions.. If required, such works would be subject to reasonable notice and either securing the required licenses or obtaining prior agreement with LBC, who may impose certain restrictions.

Health and Safety

5.65 All works on-site would be undertaken in accordance with the provisions of the Construction (Design and Management) (CDM) Regulations 2015[2]. A Principal Designer would be appointed by the Applicant and would work with the Project Team to ensure compliance with these Regulations.

5.66 All method statements would incorporate regulatory safety matters and a Health and Safety File would be maintained on-site for inspection by the Health and Safety Executive, the LBC and others as appropriate.

5.67 Although a tidy site would be maintained at all times, best practice rodent management control would be established and maintained as necessary.

Consultation

5.68 The Applicant would engage with and inform the local community and local stakeholders of particular construction tasks and indicative timelines across the individual construction phases and would ensure that both parties were fully involved in any such dialogue.

5.69 Matters for public consultation during the demolition, bulk excavation and piling works would be brought to the public's attention through staging drop-in exhibitions and the circulation of bespoke newsletters within the established catchment area. Local stakeholders would be engaged in direct communication with the Applicant, design team and other such consultants as required from time to time through the established Resident's and Community Liaison Groups. These groups would be open to new members as and when required and would be run in accordance with the stipulations of the LBC.

5.70 The Applicant's procedures would allow for:

- a clear point of contact for the public to make enquiries and to submit complaints to;
- details of how enquiries would be registered and progressed;
- advising of the intended timescales for responding to any matters raised;
- records of any responses given, and to whom; and
- escalation procedures if the Applicant's response was not considered satisfactory.

5.71 The Applicant would endeavour to liaise and co-ordinate with other development works in close proximity to the application site, such as the HS2 scheme, to reduce, as far as reasonably practicable, potentially adverse cumulative impacts.

Materials and Resource Use

Demolition and Earthworks

5.72 The Applicant has estimated that approximately 1,000 m^3 of material is expected to be generated during the demolition phase. Approximately 94,000 m^3 of material is expected to be generated during the earthworks, excavation of the basement and foundations. Wherever possible, site preparation, demolition and excavation materials would be re-used on-site or taken off site to be recycled in accordance with the waste hierarchy.

Construction

5.73 Detailed construction waste volumes cannot be estimated at this stage of the planning process with a high degree of certainty as detailed construction methods have not yet been prepared. As indicated earlier and later in this chapter, the Applicant will prepare a SWMP to ensure construction waste generation is minimised and that re-cycling and re-use opportunities are maximised where ever possible.

Plant and Equipment

5.74 Consideration has been given to the types of plant and equipment that are likely to be used during the demolition and construction works. The typical types of plant and equipment associated with each key element of the works are set out within Table 5.2.

[2] Secretary of State, 2015. Construction (Design and Management) Regulations. HMSO.

Table 5.2: Estimated Plant and Equipment Types and Quantities

Plant/Equipment	Stage			
	Enabling Works and Demolition	Substructure	Superstructure	Fit-Out
Tracked / wheeled 360° excavators	✓	✓		
Breakers	✓	✓		
Crushers	✓	✓		
Dumpers	✓	✓	✓	
Concrete crushing plant	✓			
Mobile / tower cranes		✓	✓	
Muck away trucks	✓	✓		
Air compressors	✓	✓	✓	
Diamond cutting tools / saws		✓	✓	✓
Hand / power tools	✓	✓	✓	✓
Wheel washing plant	✓	✓		
Piling rigs		✓		
Scaffolding	✓	✓	✓	
Mobile access platforms		✓	✓	✓
Goods / passenger hoists			✓	✓
Delivery trucks		✓	✓	✓
Skips and skip trucks	✓	✓	✓	✓
Forklift trucks			✓	✓
Road Sweeper	✓	✓	✓	

Note: ✓ Usage of plant at the respective construction phase stage

Material Distribution Strategy

5.75 The application site crane strategy is yet to be finalised; however at this stage it is expected that during construction eight tower cranes would be utilised to serve all the buildings – although not all the cranes would be in use concurrently. The cranes would be responsible for moving materials vertically, directly from the vehicle unloading areas to the work face. The crane strategy would be prepared in accordance with the appropriate Aviation, Highways and Rail obligations. There are specific obligations for working adjacent rail assets. Proposals together with design and calculations would be sent to the rail asset owner for checking and to gain consent. The crane strategy would dictate the routing of deliveries to the crane pick points.

5.76 Internal fit out materials would be distributed by goods / passenger hoists on each building to the relevant floor.

Access and Routing Arrangements

5.77 Construction access would be from Chalk Farm Road. The main site entrances and exits would be from Juniper Crescent. There may be a short period of time when access is required directly from Chalk Farm Road due to construction constraints of the PFS parcel, but this would be kept to a minimum.

5.78 Generally all vehicles would be able to turn on-site, but when vehicles arrive at site they would always be directed by security / banksmen including exiting back onto public roads.

5.79 All construction vehicles would be instructed to travel to site from the A406 in the north and via the A502 to Chalk Farm Road as shown in Figure 5.4.

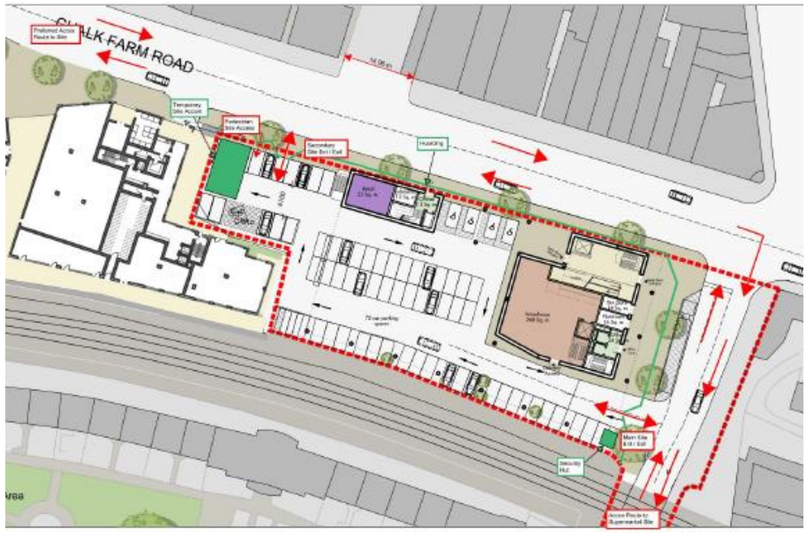

Figure 5.4: Construction Vehicle Routing

5.80 No access would be provided from Gilbey's Yard.

5.81 Taking into account the vast amount of infrastructure improvements and construction works within the surrounding area, contractors would plan their routes (TfL's freight journey planner is a notable tool) based on TfL's Construction Logistics Information Plan.

5.82 The Applicant has investigated the use of either the canal or Network Rail infrastructure to remove or deliver goods to site; neither of these options are viable do to for the following reasons:

- The canal is not immediately adjacent to the application site and would require materials to be moved across private land and over the head of a public footpath;
- There are not any rail sidings adjacent to the application site to allow trains to loaded or unloaded without disrupting rail services; and
- The overhead power cables to the rail lines prevent loading.

Demolition and Construction Vehicles

Trip Generation

5.83 Estimated numbers of demolition and construction related vehicle journeys have been calculated based on volumes of demolition and earthworks/excavated waste material together with imported materials. Overlapping phases have also been accounted for. The peak construction period would involve up to 85 daily vehicle movements per day for approximately six weeks although the remainder of the construction period, the total vehicle movements would be significantly less.

5.84 The construction of the proposed development would utilise modern prefabrication methods of construction where possible, to minimise the number of vehicle movements. The peak period for vehicle movements would occur in the early stages of construction to the MS parcel for a period and would predominantly comprise the removal of spoil and demolition material, and delivery of concrete during piling and substructure operations.

Traffic Management

5.85 Temporary signage would be installed where required. The site entrance would be manned full time by a gateman to ensure that deliveries, operatives and visitors to the site can be carefully monitored and controlled.

5.86 To further minimise the likelihood of congestion, strict monitoring and control of all vehicles entering and exiting the application site would be maintained including the following measures:

- Specific delivery dates and collection times would be set, where feasible;
- Deliveries would be consolidated where feasible;
- Deliveries would be carefully planned at all stages of the work to ensure that the number of vehicles arriving to make a delivery do not exceed the space available on site;
- Vehicles would not be allowed to wait on any adjoining roads;
- A system of 'just in time' deliveries would be maintained; and
- Authorisation would be required when visiting the site via vehicles.

5.87 Provisions would be made within the site for essential on-site parking only, but otherwise there would be a general policy of no on-site car parking. The site labour force would be encouraged to use public transport.

5.88 The Main Contractor would be required to provide suitable wheel-washing facilities at the application site exit. In addition, a road sweeper would be used to clean highways in the vicinity of the application site from any site-generated matter where necessary. These provisions would be implemented through a CTMP prepared prior to the commencement of demolition and construction works.

5.89 The Applicant would register to the Construction Logistics and Community Safety (CLOCS) scheme. It would be a mandatory requirement that all regular delivery vehicles must operate within the 'Fleet Operators Registration Scheme' (FORS) and CLOCS, and regular monitoring records must be issued monthly at progress meetings or via the Applicant buying department.

Environmental Management Controls and Mitigation

5.90 A review has been undertaken of the potential sources of impacts associated with the demolition and construction works. Such impacts can arise from day to day construction operations; from individual instances of accident; poor operation; or management. They are, however, largely dependent on the effective implementation of standard management controls, for example, the implementation of dust suppression methods, the use of a well trained workforce and properly maintained plant. In order to minimise impacts during the demolition and construction works, the Main Contractor would have a project specific CMP in place to ensure that environmental impacts are effectively mitigated.

5.91 An overview of the potential impacts during the demolition and construction works is provided in Table 5.3.

Table 5.3: Demolition and Construction Impacts and Mitigation

Issue	Potential Impacts
Archaeology	• Truncation, removal, destruction of resources.
Ground	• Mobilisation of contamination.
Noise	• Noise from vehicles. • Noise from plant during demolition, piling and general construction works e.g. from the use of air compressors and piling rigs.
Vibration	• Vibration from vehicles. • Vibration levels from plant during demolition, piling and general construction works e.g. from piling rigs.
Dust / air quality	• Windblown dust from exposed ground surfaces, stockpiles, vehicles, work faces, and cutting and grinding of materials. • Exhaust emissions from lorries and plant delivering and removing materials, and plant operating on-site.
Waste	• Waste generation and disposal.
Water	• Contamination of groundwater through the mobilisation of ground contamination and creation of pathways. • Potential disturbance of groundwater. • Contamination of surface water runoff through accidental spills, discharges to drains / stormwater systems • Demand on water supply and existing drainage systems. • Wastewater generation.
Traffic	• Traffic congestion caused by site traffic, predominantly HGVs. • Transfer of mud and material from vehicles onto the public highway. • Disruption due to abnormal loads.
Pedestrian and cycle access	• Restrictions on pedestrian and cycle access to walkways, footpaths and roads.
Human health	• Risk of exposure of the workforce to hazardous materials and potentially contaminated land. • Dust inhalation.
Ecology and Trees	• Vegetation removal. • Damage to root protection areas of trees.
Views	• Change in views of the application site as a result of introduction of construction equipment, particularly cranes.
Residential Amenity	• Noise • Dust

5.92 A CMP will be prepared for the proposed development in line with LBC minimum requirements for building/construction/demolition sites. The structure and content of the plan will be agreed with LBC and other relevant bodies prior to the commencement of the works. The CMP will be an operational manual detailing the management, monitoring, auditing and training procedures to be followed during the works.

5.93 The CMP would generally include the following:

- A framework for compliance with relevant legislation and guidance;
- Details of the construction activities to be undertaken e.g. plant to be used, prohibited or restricted operations;
- Roles and responsibilities of key staff including training of staff, liaison with stakeholders and management of enquiries and complaints;
- Details of general site management practices, including working hours, hoarding, access, lighting, site facilities, energy and water use, waste, materials procurement and storage;
- Details of environmental management and control procedures, covering traffic and access, noise and vibration, dust, archaeology and built heritage, contamination, hazardous materials, drainage and pollution control; and
- Requirements for auditing, monitoring and record-keeping.

5.94 Further detail on key individual subjects of the CMP is provided in the following sections.

Consultation

5.95 The Applicant would engage with and inform the local community and local stakeholders of particular construction tasks and indicative timelines across the individual construction phases and would ensure that both parties are fully involved in any such dialogue.

5.96 Matters for public consultation during the demolition, bulk excavation and piling works would be brought to the public's attention through staging drop-in exhibitions and the circulation of bespoke newsletters within the established catchment area. Local stakeholders would be engaged in direct communication with the Applicant, design team and other such consultants as required from time to time through the established Resident's and Community Liaison Groups. These groups would be open to new members as and when required and would be run in accordance with the stipulations of LBC.

5.97 The Applicant's procedures would allow for:

- a clear point of contact for the public to make enquiries and to submit complaints;
- details of how enquiries would be registered and progressed;
- advising the intended timescale for responding to the matter raised;
- records of any responses given, and to whom; and
- escalation procedures if the response is not satisfactory.

Scope of Construction Management Plan

5.98 As noted earlier the CMP would set out measures to avoid, reduce, offset or mitigate potential adverse environmental impacts during the demolition and construction stage. The preparation of the CMP is an established means of managing environmental impacts resulting from construction works. The CMP would be submitted to LBC (and other relevant bodies) prior to the commencement of the works for discussion and agreement. It would include the following:

- Provision for reporting, public liaison, and prior notification of construction related issues;
- Mechanism for the public to register complaints and the procedures for responding to complaints;
- A broad plan of the phasing of the work and its context within the whole project;
- Details of prohibited or restricted operations (location, hours etc.);
- Details of construction operations highlighting any operations likely to result in disturbance and / or working hours outside the core working period, with an indication of the expected duration of key phases and dates;
- Commitment to ensure all Non Road Mobile Machinery (NRMM) comply with the standards set in the Mayor of London's The Control of Dust and Emissions During Construction and Demolition SPG;
- Details of proposed routes for heavy goods vehicles travelling to and from the site;
- Housekeeping procedures and environmental control measures, which would include:
  - Erect solid barriers along the site boundary;
  - All site personnel would be fully trained;
  - Trained and responsible manager on-site during working times to maintain logbook and carry out site inspections;
  - All vehicles to switch off engines – no idling vehicles;
  - Effective vehicle cleaning and specific fixed wheel washing on leaving the site and damping down of haul routes;
  - All loads entering and leaving the Site would be covered, where necessary;
  - No site runoff of water or mud;
  - On-road vehicles to comply to set emission standards;
  - Securely cover skips and minimise drop heights;
  - Use of water as dust suppressant where applicable;
  - Ensure concrete crusher or concrete batcher has permit to operate;
- Baseline levels for noise and vibration monitoring protocols;
- 'Action Levels' for noise, vibration and dust to warn of activities which may require particular care and control. It should be noted that departures from these levels does not necessarily mean that conditions would be unacceptable or that complaints would occur; and
- Any requirement for monitoring and record keeping.

Considerate Constructors Scheme

5.99 The site would be registered with the 'Considerate Constructors Scheme'[3]. This scheme ensures that contractors carry out their operations in a safe and considerate manner with due regard to neighbours, passing pedestrians and road users.

Emergencies and Environmental Incidences

5.100 Protocols to be implemented on-site in instances of emergencies and environmental incidences would be set out within the CMP for approval by LBC.

Housekeeping and General Site Management

5.101 Hoardings would be erected around the application site to provide a clear and secure demarcation between operational activities and other areas and to provide information regarding the proposed development and its progress. Particular attention would be paid to locations supporting higher volumes of pedestrian movement, demolition and construction routes, access gates and security arrangements.

5.102 Contractors and their subcontractors would be expected to maintain a tidy site. A street sweeper would be employed as required during the demolition, piling and excavation periods of the construction programme to make sure that the streets around the application site would be kept clean during the works.

Noise and Vibration

5.103 Effective co-ordination and time management of demolition and construction activities would be important to avoid noise and vibration nuisance to surrounding uses. In addition, early and helpful communications with the surrounding and on-site receptors would be undertaken to manage any complaints arising during the demolition and construction works of the proposed development.

5.104 Contractors would be required to ensure that works are carried out in accordance with best practicable means as stipulated in the Control of Pollution Act 1974[4]. A full explanation of measures to control construction noise would be incorporated within the CMP and detailed in all construction method statements.

5.105 As set out in Chapter 9: Noise and Vibration, noise levels from the demolition and construction of the proposed development have been predicted at noise-sensitive properties in close proximity to the application site and the impact of the noise assessed. Noise levels likely to be generated by the demolition and construction works have been predicted based on the type and number of plant likely to be in operation.

5.106 Noise and vibration monitoring would be undertaken to the levels set out in ES Chapter 9: Noise and Vibration. Monitoring would be undertaken on a regular basis during the demolition and construction

[3] Considerate Constructors Scheme http://www.ccscheme.org.uk/.
[4] Secretary of State, 1974. Control of Pollution Act. HMSO.

works, both on-site and at sensitive receptors adjacent to the applicaotn site, to monitor potential impacts to site workers, residents and adjacent buildings. Levels found to exceed pre-agreed limits would be subject to documented corrective action, which would be audited as part of the overall EMP.

5.107 The Main Contractor would meet with the Local Authority in order to formulate a Section 60/61 agreement prior to commencement of the works. The hours, methods, predicted plant, restrictions and noise predications would be described in the Section 60/61 Agreement.

5.108 The precise scope of noise control cannot be specified until detailed construction method statements are completed. However, the following standard best practice would be implemented as a minimum:

- Careful selection of demolition and construction methods and plant used to minimise noise at source as far as reasonably practical;
- Use of electric and electro-hydraulic plant and equipment where practical;
- Switching off engines when not in use;
- The use of acoustic barriers where appropriate;
- Use of non-percussive tools and equipment where practical;
- Planning all mass concreting operations for weekends whenever possible;
- Parking construction traffic off the public highway;
- Controlling the discharge of trucks from site to avoid congestion;
- Implementing traffic management systems at the entrances to the application site at all times to control the traffic into the application site;
- Planning deliveries and removals out of peak hours as far as possible;
- Maintaining a minimum 2.4 m high hoarding around the site boundary to screen noise from low level sources and/or street level receptors;
- Using 'silenced' plant and equipment wherever possible and maintaining/servicing plant on a regular basis and ensuring these would be certified to meet relevant current legislation and BS5228 standards;
- Operating plant at low speeds where possible and incorporating automatic low speed idling;
- Siting noisy activities away from sensitive receptors, where possible;
- Temporarily screening or enclosing static noisy plant to reduce noise emissions and certifying plant to meet relevant standards;
- Adhering to threshold noise and vibration limits set in ES Chapter 9; Noise and Vibration;
- Implementing noise and vibration monitoring to accord with levels set out in ES Chapter 9; Noise and Vibration;
- Minimising disturbance from reversing bleepers through measures such as site layout, provision of screening or use of broadband sound emitting reversing alarms;
- Switching off vehicle engines where vehicles are standing for an extended period of time;
- Lowering materials whenever practicable rather than dropping;
- Making all contractors familiar with the guidance in BS 5228[5] and BS 7385[6] which would form a pre-requisite of their appointment;
- Use of mono flexed scaffold to prevent any construction materials falling onto public highways which also contains additional acoustic absorption;
- Loading and unloading of vehicles, dismantling of site equipment such as scaffolding or moving equipment or materials around the site would be conducted in such a manner as to minimise noise generation and where practical would be conducted away from noise sensitive areas;
- Deviation from approved method statements to be permitted only with prior approval from the Main Contractor and other relevant parties. This would be facilitated by formal review before any deviation is undertaken; and
- Noise complaints, or occasions of exceeded action levels would be reported to the contractor and immediately investigated.

Air Quality

5.109 The application site preparation, demolition and construction works would be carried out in such a way so as to limit the emission to air of pollutants. Control and mitigation measures would be particularly important during demolition, earthworks and dry weather.

5.110 Dust and air quality would be managed during demolition and construction works to meet, amongst others, provisions of the Environmental Protection Act 1990, the Clean Air Act 19937 and other statutory requirements. These requirements and other recommendations in Best Practice Guidance would be set out in the CMP to include as a minimum and in addition to the measures outline in the noise and vibration section above:

- Planning site operations to take into account prevailing wind patterns and off site receptors;
- Siting handling and storage areas as far away as reasonably and practically possible from public/residential areas. Handling and storage areas would be actively managed and fine, dry material would be stored inside enclosed shields or within a central storage area;
- Damping down surfaces during spells of dry weather;
- Off-site steel and services prefabrication to limit the welding and cutting of materials on-site;
- Effective wheel and body washing of vehicles leaving site;
- Off-site prefabrication to be used, where practical, including the use of prefabricated structural elements, cladding units, toilets, mechanical and electrical risers and packaged plant rooms;
- Burning of waste or unwanted materials would not be permitted onsite;
- All hazardous materials including chemicals, cleaning agents, solvents and solvent containing products to be properly sealed in sealed containers at the end of each day prior to storage in appropriately protected and bunded storage areas;
- Covering any storage areas that are not enclosed;
- Avoiding prolonged storage of debris on-site;
- Sheeting potentially dusty vehicle loads to prevent any escape of materials;
- Using water sprays and wind/dust fences where possible, particularly in dust sensitive locations i.e. during construction works, water spraying and/or screening would be implemented; and
- Where practicable employing cleaner fuels for construction plant.

5.111 The Applicant would give detailed dust control proposals as part of their demolition and construction contracts and would need to comply with them.

Archaeology

5.112 During demolition and substructure works, there is the potential for impacts on archaeological remains beneath the application site however this is considered to be very low potential for these remains for all past periods of human activity prior to the nineteenth century.

[5] British Standards Institution, 2009. BS 5228:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites. BSI.
[6] British Standards Institution, 1993. BS 7285:1993 Evaluation and Measurement for Vibration in Buildings. Guide to Damage Levels from Groundborne Vibration. BSI

[7] Secretary of State, 1993. The Clean Air Act. HMSO.

5.113 Given the application site's previous construction history associated with the former Camden Goods Station and horse stables and the installation of the underground fuel storage tanks on the PFS parcel undertaken within the 19th century, it is understood that any archaeological remains would have already been disturbed. Therefore the proposed development is unlikely to generate significant effects as a result of the piling the excavation works.

5.114 However, the construction of the proposed development still does have the potential for localised impacts on archaeological remains, particularly in relation to industrial archaeological remnants and therefore further archaeological mitigation is expected to include evaluation and recording works and would be secured by condition as agreed by LBC.

Contaminated Soil

5.115 According to a Preliminary Risk Assessment undertaken of the application site (Technical Appendix 2.2, ES Volume 3A) the report identified generally low levels of soil and groundwater contamination which is not considered to present an unacceptable risk to human health or controlled waters when taking into account risk management produces are implemented during construction.

5.116 Management of risk during the demolition and construction works in relation to ground contamination would comprise the following:

- Works would be carried out under appropriate site management protocols that would prevent the creation of dust and site run-off, including appropriate Personal Protection Equipment (PPE) and hygiene facilities, control of arisings and good site housekeeping;
- The creation of dust would be prevented and hence prevent fibre inhalation on site and dust emissions from the works;
- The requirements described in Control of Asbestos Regulations (CAR) 2012 and Construction Industry Research and Information Association (CIRIA) C733 would be followed where applicable. A recent guide was published by CL:AIRE referred to as Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition (C&D) materials: Industry Guidance (CAR-SOILTM)', which is currently the most authoritative guide on the topic and would be followed. CAR-SOILTM confirms that all work with asbestos in soil would be carried out under a 'plan of work' and defines the contents of that plan, this would also identify if the works with asbestos would be licensed, notifiable non-licensed work or non-licensed work and what notifications and health surveillance is required;
- Sufficient hygiene units and PPE would be provided for the works. Suitably competent personnel would advise on and supervise the works and all staff should be briefed on the working methods;
- Services, utilities, and soft and hard landscaping areas that may require future maintenance would be provided with a marker sheet, denoting the potential presence of asbestos below the marker sheet, and sufficient cover clean backfill, such that the potential for future exposure is limited. Such measures and residual risks should be recorded within the Health and Safety File for ready reference by future stakeholders;
- The contractor would prepare a method statement detailing how unexpected contamination would be dealt with would be encountered during the works;
- A management strategy for the import of material would be documented in a method statement;
- On-site stockpile or in-situ validation chemical testing would be undertaken; and
- A brief verification report would be prepared following completion of the works to demonstrate that the requirements of the remediation strategy and verification plan have been achieved.

5.117 SI works would be carried out prior to redevelopment works in order to add detail to the ground and groundwater profiles and so the geotechnical and geo-environmental risks associated with the application site can be made. The investigation would allow a quantitative assessment as to whether any of the potential risks identified in this study are present and are of material concern to the proposed development.

Water Resources

5.118 The operation of demolition and construction vehicles and general on-site activities can give rise to the potential for surface run-off to become contaminated with hydrocarbons, silt or other construction materials. This may in turn lead to a contamination event should site drainage be allowed to enter the ground untreated.

5.119 To ensure that no contaminant-pathway-receptors pathways are created and to reduce the potential for contamination to occur during the construction works, all site activities would be undertaken in accordance with the requirements of the following legislation:

- Water Resources Act 1991[8];
- Water Act 2003[9];
- Control of Pollution (Oil Storage) Regulations 2001[10]; and
- EA's Pollution Prevention Guidelines 1 (PPG1)[11], PPG2, PPG3 and PPG6.

5.120 The CMP would furthermore include the following provisions:

- Regularly maintaining construction vehicles to reduce the risk of hydrocarbon contamination;
- Storing, handling and managing construction materials with due regard to the sensitivity of the local aquatic environment and thus the risk of accidental spillage or release;
- Locating above ground storage tanks on designated areas of hardstanding;
- Not using any underground storage tanks;
- Storing liquids such as degreasers, solvents, lubricants and paints in segregated, bunded enclosures;
- Ensuring that any tanks storing more than 200 litres of oil on-site, would have secondary bunding. Bunding would be specified as having a minimum capacity of *"not less than 110 % of the container's storage capacity or, if there is more than one container within the system, of not less than 110 % of the largest container's storage capacity or 25 % of their aggregate storage capacity, whichever is the greater"* as required under the Control of Pollution (Oil Storage) Regulations.

5.121 In addition, any construction drainage system would be designed and managed to comply with BS6031:2009 – British Standard Code of Practice for Earthworks,[12] which details methods that should be considered for the general control of drainage on construction sites. Further advice is also contained within BS8004: 1986[13] and BSEN 1997-1-Eurcode 7, Geotechnical Design, General Rules[14]. Wherever possible, the Applicant would be encouraged to minimise the amounts of wastewater discharged from the application site.

Ecology

5.122 The potential ecological effects of the proposed development are discussed in the Preliminary Ecological Assessment (PEA) (Technical Appendix 2.1, ES Volume 3A). The PEA outlines a number of recommendations to preserve and enhance the ecology present on the application site during the demolition and construction stages of the proposed development, which would be adopted during the development works. These comprise the following:

- Any excavations that need to be left overnight would be covered or fitted with mammal ramps to ensure that any animals that enter can safely escape. Any open pipework with an outside diameter

[8] Secretary of State, 1991. Water Resources Act. HMSO.
[9] Secretary of State, 2003. The Water Act. HMSO.
[10] Secretary of State, 2001. The Control of Pollution (Oil Storage) Regulations. HMSO.
[11] Environment Agency, 2001. Pollution Prevention Guidelines 1: General Guide to the Prevention of Pollution. Environment Agency

[12] British Standards Institution, 2009. BS6031: 1998 The British Standard Code of Practice for Earthworks. BSI.
[13] British Standards Institution, 1986. BS 8004: 1986 British Standard Code of Practice for Foundations. BSI.
[14] British Standards Institution, 2004. BS EN 1997-1: Eurocode 7: Geotechnical Design –Part 1: General Rules. BSI.

of greater than 120 mm would be covered at the end of each work day to prevent animals entering/becoming trapped;

- Vegetation clearance would ideally be undertaken outside the nesting bird season. The nesting bird season is weather dependent but generally extends between March and September inclusive (peak period March-August). If this is not possible then any vegetation to be removed or disturbed would be checked by an experienced ecologist for nesting birds immediately prior to works commencing. If birds are found to be nesting any works which may affect them would have to be delayed until the young have fledged and the nest has been abandoned naturally, for example via the implementation of an appropriate buffer zone (species dependent) around the nest in which no disturbance is permitted until the nest is no longer in use;
- A Method Statement would be developed for the proposed works to ensure that they do not result in the spread of any invasive non-native species (i.e. buddleia and wall cotoneaster). This method statement would be discussed with the Environment Agency.

5.123 A Preliminary Bat Roost Assessment was completed to determine the suitability of the site for nesting and foraging bats. In the unlikely event that a bat is found during demolition works all works would immediately cease and a suitably qualified ecologist should be contacted.

5.124 All lighting spill and the direction of lighting would be considered to limit the impact of light pollution on bats through the careful use of lighting in critical areas such as in areas close to the Grand Union Canal to the south of the application site and at a low level with minimum spillage.

Arboriculture

5.125 An Arboricultural Impact Assessment accompanies the application. The arboricultural survey identified 92 trees of varying retention value, on and within the application site boundary. To protect the trees identified for retention as part of the proposed development, the following site specific recommendations would be followed:

- To avoid damage to young trees being retained within the site, spiral guards or mulch circles would be placed around them;
- In general all new development would be located outside of the root protection area (RPA) or canopy spread of any retained tree;
- Where any new development is proposed within the RPA or canopy spread of a retained tree it would be constructed in such a way that damage of the trees root system or crown can be avoided; and
- Should new development require works within the RPA of any retained tree an Arboricultural Method Statement would be prepared to set out what steps are to be taken to protect the trees during the course of the development stage.

5.126 In addition to the following generic measures would be undertaken during demolition and construction:

- Any trees or groups that are to be retained would be adequately protected by Heras fencing, in line with BS5837:2012, extending at least to the Root Protection Radius, to prevent accidental damage by vehicles or contractors;
- All tree works would be undertaken by a competent and qualified arboriculturalist;
- Tree protection would be included in the induction and/or briefing sessions by the contractors to site personnel;
- Heavy machinery and the storage of materials would be excluded from the crown and Root Protection Radius of all trees;
- The recommendations of BS5837:2012 and National Joint Utilities Group Volume 4 (Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees) (as appropriate to operations) would be followed when working close to trees;
- If works take place during the bird breeding season, usually from March to September inclusive, trees and hedgerows would be checked for nesting birds. If any trees are to be removed this would be done outside the breeding season or in the presence of a suitably qualified ecologist; and
- Prior to undertaking works to trees, a check to see if they are being used for bat roosting would be undertaken by a suitably qualified and experienced ecologist.

Energy and Water Usage

5.127 All relevant contractors would be required to investigate opportunities to minimise and reduce the use of energy and water, including:

- Use of alternatives to diesel / petrol powered equipment would be investigated and used where it is practicable and reasonably economic to do so;
- Careful selection and specification of energy efficient plant and equipment would be employed;
- Implementation of staff based initiatives such as turning off taps, plant and equipment when not in use both on-site and within site offices; encouraging a paper-reduced office and encouraging double sided printing and photocopying when these activities are necessary;
- Use of recycling water systems such as wheel washes; and
- Use of a rainwater harvesting system for use in equipment and vehicle washing would also be investigated.

Hazardous Materials and Waste

5.128 The compulsory requirement for a SWMP was scrapped in 2013, following the repeal of the SWMP Regulations 2008, which required all construction projects in England worth more than £300,000 must have a SWMP. It is however considered best practice to implement a SWMP to monitor the types and quantities of waste produced during every stage of the project, which also identifies opportunities to reduce, re-use and recycle material.

5.129 One individual (for example, the Main Contractor) would be responsible for writing, implementing, auditing and updating the SWMP.

5.130 As part of this, and in accordance with the principles laid down in the UK Government's 'Waste Strategy for England 2007'[15] and GLA 'Municipal Waste Management Strategy Rethinking Rubbish in London'[16] a SWMP would be produced and agreed with LBC, (as part of the CMP) before on-site works begin, which would look into the opportunities to minimise and reduce waste generation, such as:

- Agreements with material suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme;
- Implementation of a 'just-in-time' material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste;
- Attention to material quantity requirements to avoid over-ordering and generation of waste materials;
- Re-use of materials wherever feasible, e.g. re-use of excavated soil for landscaping. Concrete would be taken off-site for crushing and re-use;
- Segregation of waste at source where practical; and
- Re-use and recycling of materials off-site where re-use on-site is not practical (e.g. through use of an off-site waste segregation facility and re-sale for direct re-use or re-processing).

[15] UK Government, 2007. Waste Strategy for England 2007.

[16] Greater London Authority, 2003.The Mayor's Municipal Waste Management Strategy - Rethinking Rubbish in London.

5.131 The Government has set broad targets for the use of reclaimed aggregates and in keeping with best practice, deconstruction and construction contractors would be required to maximise the proportion of materials recycled. The disposal of all waste or other materials removed from the site would be in accordance with the requirements of the Environment Agency and all relevant legislation.

5.132 At this stage a detailed specification of materials to be used on-site is not available but it is inevitable that some materials to be used would be classed as hazardous, e.g. adhesives, mastics, diesel oil, etc. Key waste management procedures include:

- As part of the designer's risk assessments all materials must be reviewed to determine whether there is an alternative material that can be used which is less hazardous;
- Any residual hazardous materials included in the designs, and identified on the Design Risk Assessments issued by designers, or identified by the Construction Design and Management (CDM) Co-ordinator, would be listed within the Health and Safety Plan. Before any of these materials are delivered to site the manufacturers' Control of Substances Hazardous to Health (COSHH) data sheets would be obtained to ensure suitable storage facilities are available on-site, the operatives are fully briefed in the use of the material together with protective equipment required to be worn and finally the safe disposal of excess material or containers;
- Where space permits on-site, waste would be segregated into labelled and colour coded containers. Where space does not permit segregation on-site, waste would be taken to a licensed waste recycling / transfer station where it would be processed; and
- All waste from the Applicant's sites is removed by a licensed waste management company who are part of a group agreement, which ensures that all necessary regulations are adhered to and records kept of the transport and disposal of all types of materials.

Summary and Conclusions

5.133 A site-specific EMP would be developed and agreed with LBC and other relevant bodies, prior to the commencement of on-site works, which would comply with LBC's CoCP and the mitigation measures set out within this chapter. In addition, the Main Contractor would be a member of the Considerate Constructors Scheme, and would adhere to the CMP.

5.134 The CMP would provide a method of managing the demolition and construction works. It would outline methods for liaison; hours of work; methods to deal with complaints; and outline management practices to control noise, vibration and dust, traffic and access, waste, water resources and archaeology, ensuring a high level of control throughout the demolition and construction stage. Demolition and construction waste generation would be monitored and kept to a minimum where practicable. The re-use and recycling of material would be encouraged.

6 SOCIO-ECONOMICS

Introduction

6.1 This chapter of the ES presents an assessment of the potential impacts and associated likely socio-economic effects arising from the demolition and construction works, and on completion of the proposed development.

6.2 This chapter describes the socio-economic policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the application site; the potential direct, indirect and wider socio-economic impacts and likely effects taking into consideration embedded mitigation measures; the need for additional mitigation; and the significance of residual effects. Consideration is also given to inter-project cumulative effects.

6.3 In particular, this chapter presents the results of the assessment of the likely effects related to employment, economic productivity; population, labour force and skills; business space and activity; housing provision; local expenditure; public revenue; education (primary and secondary level); healthcare facilities; open space and recreation opportunities; children's playspace and crime.

Legislation and Policy Context

National Legislation and Policy

National Planning Policy Framework, 2012

6.4 The NPPF[1] sets out the Government's statutory planning policies for England, with the planning system expected to play both an economic and social role as discussed at paragraph 7:

"an economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure"

"a social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being".

6.5 At the heart of the NPPF is a 'presumption in favour of sustainable development', which requires local authorities to adopt a positive approach through their Local Plans in order to seek opportunities to meet the development needs of an area. Further clarification is provided through the core planning principles set out at paragraph 17 of the NPPF:

"Proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs. Every effort should be made objectively to identify and then meet the housing, business and other development needs of an area, and respond positively to wider opportunities for growth".

6.6 A core planning principle of the NPPF focuses on the health of local communities, stating that plan-making and decision-taking should:

"Take account of and support local strategies to improve health, social and cultural wellbeing for all, and deliver sufficient community and cultural facilities and services to meet local needs"[2].

6.7 Section 8 of the NPPF relates to the contribution that the planning system can make to promoting healthy communities through provision of open space and facilities:

"Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities"[3].

Planning Practice Guidance

6.8 The NPPF is supplemented by the web-based PPG[4], which provides guidance on the following:

- Housing and economic development needs assessments;
- Health and wellbeing;
- Housing and economic land availability assessment; and
- Crime prevention and security measures;

6.9 Importantly, guidance on EIA is also provided in order to assess whether a development would have a significant effect on the environment.

Laying the Foundations: A Housing Strategy for England, 2011

6.10 In November 2011 'Laying the Foundations: A Housing Strategy for England'[5] was published by the Government. This reinforced the intentions of the Government to ensure that the housing market supported rather than constrained the economic recovery.

6.11 The strategy also acknowledged evidence – in the form of official household projections, released by DCLG in 2010 – which suggests that household formation and growth will continue to drive demand for housing, with the cited projections anticipating 232,000 households to form per year on average in England between 2008 and 2033.

6.12 The foreword of the strategy clearly sets acknowledgement from both the Prime Minister and Deputy Prime Minister of the long-term failure of successive Governments to build enough housing to meet growing need:

"One of the most important things each generation can do for the next is to build high quality homes that will stand the test of time. But for decades in Britain we have under-built. By the time we came to office, house building rates had reached lows not seen in peace-time since the 1920s. The economic and social consequences of this failure have affected millions: costing jobs; forcing growing families to live in cramped conditions; leaving young people without much hope that they will ever own a home of their own"[6].

[1] Department for Communities and Local Government, 2012. National Planning Policy Framework. London. Department for Communities and Local Government.
[2] Ibid –Para 17
[3] Ibid –Para 73
[4] https://www.gov.uk/government/collections/planning-practice-guidance
[5] Department for Communities and Local Government, 2011, Laying the Foundations: A Housing Strategy for England. London. Department for Communities and Local Government.
[6] Ibid - Page v

Fixing the Foundations: Creating a More Prosperous Nation, 2015

6.13 HM Treasury published 'Fixing the Foundations'[7] in July 2015, in order to set out the government's ambitions to increase the productivity of the UK and secure long-term economic stability and growth across the country. In order to grow productivity, the government is seeking to encourage long-term investment in economic capital and promote a dynamic economy that encourages innovation and helps the flow of resources to their most productive use.

6.14 The long-term failure to build sufficient new homes to meet demand is noted within the strategy, with a view that this has harmed productivity and restricted labour market flexibility. An effective housing market can support economic growth, by enabling the economy to adapt to change and ensure that people can live close to where they work.

Fixing our Broken Housing Market, 2017

6.15 In February 2017, the Government published its Housing White Paper, titled 'Fixing our Broken Housing Market'[8]. This acknowledged and seeks to address the long-term undersupply of housing in England, which has wider implications for the performance of the economy:

"Sky-high property prices stop people moving to where the jobs are. That's bad news for people who can't find work, and bad news for successful companies that can't attract the skilled workforce they need to grow, which is bad news for the whole economy".

6.16 The White Paper sets out proposals to "*boost housing supply and, over the long term, create a more efficient housing market whose outcomes more closely match the needs and aspirations of all households and which supports wider economic prosperity".* The proposals included within the White Paper seek to ensure that Local Plans provide enough land for housing of the right type in the right places, with the delivery of new homes implemented within the timescales expected. The Government is also supporting a diversification in the housebuilding market, while ensuring that the short-term impacts of the housing crisis are tackled.

Regional Policy

The London Plan Spatial Development Strategy for London Consolidated with Alterations since 2011, 2016

6.17 The latest version of the London Plan[9], published in March 2016, sets out the spatial development strategy for Greater London. The Plan sets out the following vision for London over the period to 2036, and beyond:

"*Excel among global cities – expanding opportunities for all its people and enterprises, achieving the highest environmental standards and quality of life and leading the world in its approach to tackling the urban challenges of the 21st century*".

6.18 The London Plan recognises that as an Inner London borough, Camden experiences a range of challenges relating to tackling deprivation, improving residents' quality of life and creating appropriate economic opportunities. The strategic policy for inner London is to:

"*Sustain and enhance its recent economic and demographic growth while also improving its distinct environment, neighbourhoods and public realm*".

6.19 Camden Town is classified in the London Plan Town Centre designations as a 'major town centre' and as having medium growth potential. Policy '2.15 – Town Centres' outlines that boroughs should sustain and enhance the vitality of centres by, for example, encouraging retail space and ensuring spaces create community engagement.

6.20 Other London wide policies which relate to the economic character of the application site are as follows:

- '4.2 - Offices' - Support mixed use developers providing opportunities for business of a variety of sizes. Further guidance in the Town Centres SPG[10] emphasises the need for new office development to occur in locations with good public transport;
- '4.3 - Mixed use development and offices' - Development should enhance the quality of the local office stock; and
- '4.7 - Retail and town centre development' - Retail and commercial development should be focussed on sites within town centres.

6.21 The London Plan also sets an annual housing target for the borough. Policy '3.3 – Increasing housing supply' outlines the pressing needs for more homes in London by setting a target of 42,000 net additional homes across London for the period 2015/16 to 2024/25. Camden has a minimal annual target of 889 dwellings and a minimum 8,892 dwelling ten year target. Policy '3.11 – Affordable housing targets' outlines that a proportion should be social/affordable rent and/or intermediate.

6.22 Planning policy in London also emphasises the social function of the built environment, as well as the economic. The London Plan emphasises the needs to create "*diverse, strong, secure and accessible neighbourhoods*" by creating an inclusive environment (Policy '7.2 – An inclusive environment') and promoting a local character ('Policy 7.4 – Local character').

Housing Supplementary Planning Guidance, 2016

6.23 The Housing SPG[11] provides more detailed guidance on the implementation of housing policies in the 2016 Minor Alterations to the Plan (MALP). The SPG recognises that mixed use, town centre housing developments play an important role in meeting this demand:

"*Mixed use development provides a way in which different uses can be accommodated on the same site or neighbourhood, helping to reduce the need to travel; optimise the use of scarce land available for new development; and make the best use of infrastructure capacity*"[12].

6.24 The document recognises the vital role large sites have in meeting London's housing need and coordinating the provision of new social infrastructure. For example, the provision of pharmacies, dentists, childcare facilities etc. More detail is provided in the Social Infrastructure SPG[13].

Social Infrastructure Supplementary Planning Guidance, 2015

6.25 The Social Infrastructure SPG[14] provides further guidance on planning for social infrastructure provision. The document outlines that development should be accompanied by suitable levels of new, appropriate and enhanced social infrastructure. The following is of relevance to the proposed development:

- Health and provision of health and social care – Development should be designed, constructed and managed to promote healthy lifestyles and reduce health inequalities. An HIA should be undertaken as appropriate;
- Education – Proposals should seek to enhance education and skills provision and address shortfalls in places at local primary and secondary schools; and

[7] Department for Business, Innovation and Skills, 2015. Fixing the Foundations: creating a more prosperous nation. London. Department fir Business Innovation and Skills.
[8] Department for Communities and Local Government, 2017. Fixing our Broken Housing Market. London. Department for Communities and Local Government.
[9] Greater London Authority, 2016. The London Plan Spatial Development Strategy for London Consolidated with Alterations since 2011. London. GLA.
[10] Greater London Authority, 2014. Town Centres Supplementary Planning Guidance. London. GLA.
[11] Greater London Authority, 2016. Housing Supplementary Planning Guidance. London. GLA.
[12] Para 7.1.2, Greater London Authority, 2016. Housing Supplementary Planning Guidance. London. GLA.
[13] Greater London Authority, 2015. Social Infrastructure Supplementary Planning Guidance. London. GLA.
[14] Greater London Authority, 2015. Social Infrastructure Supplementary Planning Guidance. London. GLA.

- Community facilities – The approach to providing community facilities should be flexible so that the types of facility can be defined by local groups.

Play and Informal Recreation Supplementary Planning Guidance, 2015

6.26 Another social function of the built environment is the provision of recreation spaces. The Play and Informal Recreation SPG[15] provides more detailed guidance on policies such as '3.6 – Children and Young People's Play and Informal Recreation Facilities' and '7.18 - Protecting local open space and addressing local deficiency'. The SPG aims to ensure children and young people have safe access to good quality recreation spaces. The following benchmarks are provided:

- Space – Ensure the number of children from the development has been calculated and benchmarks are met (minimum of 10 m^2 per child); and
- Location and accessibility - Proposals should refer to distance benchmarks on maximum walking distance from residential unit to play space (100 m for under 5s, 400 m for 5-11 year olds and 800 m for 12+ years);

Central Activities Zone Supplementary Planning Guidance, 2016

6.27 Adopted in March 2016, the Central Activities Zone (CAZ) SPG sets out more detailed planning guidance with respect to policies 2.10 to 2.12 of the London Plan. This area is described as *"London's globally iconic core"* as it support a third of London's employment and 10 % of the UK's economic output.

6.28 While parts of the LBC are located within the CAZ (Euston and Kings Cross), the application site is located outside on the 'fringe' of the CAZ. The CAZ SPG outlines that the 'fringe' has an important supportive role to play by ensuring the availability of office and related workspace, including small units for start-ups, small and medium sized enterprises.

A City for All Londoners, 2016

6.29 This document[16] sets out the capital's top challenges, opportunities and policy priority areas to deliver over the next four years. The document identifies a direction for London, which will be expanded upon in more detailed strategies, including land use and growth, housing and economic development.

6.30 A City for All Londoners reflects and builds on many of the socio-economic priorities highlighted in the London Plan. For example, making space for a mixture of office, industrial and retail space. The document calls for opportunities for new workspace areas in new housing developments to be explored. There is also a renewed emphasis on creating the right spaces (size and location) for a range of businesses.

Local Policy

London Borough of Camden Core Strategy and Development Policies Documents 2010-2025, 2010

6.31 The current Local Development Framework for LBC covers the period 2010 to 2025, and comprises the Core Strategy[17] and Development Policies[18]. The Core Strategy sets out the key elements of borough's planning vision for growth and development. The plan is designed to address a number of challenges which the borough faces, such as adapting to a growing population, social changes and maintaining a successful economy. The overall vision is to ensure that "*Camden will be a borough of opportunity*".

6.32 Of relevance to the application site, there are a number of policies set out within the Core Strategy and Development Policies documents which help to meet this ambition:

- 'CS6 - Providing quality homes' – Ensuring a proportion of affordable homes across a mixture of sizes so that homes are suitable for couples and families. Camden Planning Guidance (CPG)[19] provides additional information on housing in mixed use developments. The guidance outlines that most mixed-use development should provide 50 % affordable housing;
- 'CS7 - Promoting Camden's centre and shops' – Supporting the delivery of 20,000-30,000 m^2 additional retail space in Camden Town and Euston;
- 'CS8 - Promoting a successful and inclusive Camden economy' - Creating a mixture of employment spaces by balancing managed, affordable workspace and with space for small and medium sized enterprises; and
- 'CS9 - Achieving a successful Central London' – Supporting Central London is a focus for Camden's future growth in homes, offices, shops etc.

6.33 These policies are designed to make Camden a popular place to live, work and visit. The aim is to support its growing population and businesses, by providing jobs, shops and required infrastructure.

Camden Planning Guidance 2 – Housing, 2016

6.34 This document[20] provides greater detail on affordable housing and housing in mixed used development. It is outlined that residential and mixed-use development adding 1,000 m^2 gross housing or more should provide affordable housing.

Camden Planning Guidance 5 – Town Centres, Retail and Employment, 2016

6.35 This document[21] provides further planning guidance on uses in town centres. Camden Town is one of six borough town centres. Acceptable uses in Camden Town are considered to be: core shopping frontages; secondary frontages and areas; and sensitive frontages. This document does not provide detailed policy guidance of studio or co-working office workspace.

Camden Planning Guidance 6 – Amenity, 2016

6.36 This document[22] provides further guidance with respect to open space and recreation facilities. The amount of open space provision should be 9 m^2 per occupier in a residential development. While LBC recognises that private space (such as gardens) is an important part of amenity space, this is not a substitute for public open space. Green amenity space can be formal or informal parts and provide areas of passive recreation for all age groups.

Draft London Borough of Camden Local Plan, 2016

6.37 In June 2016 LBC submitted the Draft Camden Local Plan ('The Draft Local Plan') for examination. LBC intends to formally adopt the Local Plan during June 2017. This followed a period of engagement and consultation between November 2013 and February 2015. Once adopted, it will cover the period 2016-2031 and its purpose is to:

"Create the conditions for and harnessing the benefits of economic growth, reducing inequality and securing sustainable neighbourhoods".

6.38 Policy 'G1 – Delivery and location of growth' aims to balance competing demands within the borough and identify the right locations for growth. The Draft Local Plan identifies the most significant growth will take place in highly accessible locations such as Camden Town. Such development must be "*consistent with the area priorities and principles set out*" in the Submission Document. This includes delivery of self-contained housing and affordable housing; supporting business and job provision by providing premises;

[15] Greater London Authority, 2012. Play and Informal Recreation Supplementary Planning Guidance. London. GLA.
[16] Greater London Authority, 2016. A City for All Londoners, London. London. GLA.
[17] London Borough of Camden, 2010. Core Strategy 2010-2025. London. LBC.
[18] London Borough of Camden, 2010. Camden Development Policies 2010-2025. London. LBC.
[19] London Borough of Camden, 2014. Camden Planning Guidance. London. LBC.
[20] London Borough of Camden, 2016. Camden Planning Guidance 2 - Housing. London. LBC.
[21] London Borough of Camden, 2016. Camden Planning Guidance 5 – Town centres, retail and employment. London. LBC.
[22] London Borough of Camden, 2016. Camden Planning Guidance 6 - Amenity. London. LBC.

securing the infrastructure and services needed to meet the growing number of residents, workers and visitors; and ensuring growth is delivered in a way that protects amenity.

6.39 The Draft Local Plan outlines the following policies which aim to protect and enhance the social and economic character of the borough:

- 'H1 - Maximising housing supply' – As per London Plan, sets a 20 year housing delivery target of 16,800 additional homes;
- 'H4 - Maximise the Supply of Affordable Housing' – Sets a target of 5,565 additional affordable homes from 2015 to 2030 (60% social-affordable rented and 40% intermediate);
- 'H6 - Housing choice and mix' – Addresses the size of homes needed for large and small families with children, single people, couple and other types of household;
- 'C1 – Health' – States that proposals for major applications should include a HIA;
- 'C2 – Community facilities' – Seeks contributions towards existing or providing new facilities from developments that result in additional need for community facilities;
- 'C5 – Safety and security' – States that proposals should promote safer streets and public areas and include appropriate security and community safety measures;
- 'C6 – Access for all' – Seeks to ensure buildings and spaces can be accessed by all;
- 'A2 – Open space' – Encourages the protection of non-designated spaces with nature conservation, townscape and amenity value, including gardens, where possible;
- 'E1 - Economic Development' – Supports businesses of all size, in particular start-ups, small and medium-sized enterprises and maintain a stock of premises which are suitable for a variety of businesses;
- 'E2 - Employment premises and sites' – Encourages the provision of employment premises and sites in the borough, particularly those which support the functioning of the CAZ; and
- 'TC1 - Quantity and location of retail development' – Supports the retail growth potential of Camden Town.

6.40 There are no relevant SPGs for the Local Plan Submission Draft at this stage. SPGs will be published once the emerging Local Plan has been adopted.

Camden Goods Yard Draft Planning Framework

6.41 It is the LBC's intention that the planning framework for Camden Goods Yard[23] will be adopted as a Supplementary Planning Document. The draft framework considers the area in Network Rail, Morrisons, One Housing and Market Tech ownership.

6.42 The draft framework aims to shape development to enhance the area for existing communities and to provide new homes, jobs, open space and facilities to create an integrated and attractive place to live, work and visit. It highlights that redevelopment would create an opportunity to build upon the vibrant commercial environment of Camden Town and connect with the unique economy of the town centre. In addition that redevelopment should create a place that facilitates healthy, happy and inclusive community life.

Other Relevant Guidance

Additionality Guide, 2014

6.43 The Homes and Communities Agency (HCA) Additionality Guide[24] forms the relevant national framework for assessment of the likely socio-economic effects of proposed development. The document provides guidance to practitioners on the standard methodology and issues associated with assessing the additional effects of development.

6.44 Utilising the approach set out within the Guide ensures conformity to nationally accepted standards for assessing potential socio-economic effects, and is entirely appropriate for the purposes of assessing planning applications for proposed development schemes. The nuances of a scheme and its location are taken in to account in any assessment.

Employment Density Guide, 2015

6.45 The Employment Density Guide (3rd edition)[25] was published in 2015 by the HCA and is designed to assist in the estimation of employment generated by development.

6.46 The Guide provides guidance to practitioners on the standard methodology and issues associated with assessing the level of direct employment per square metre of development. Utilising the approach set out within the Guide ensures conformity to nationally accepted standards for assessing potential socio-economic effects, and is entirely appropriate for the purposes of assessing planning applications for proposed development schemes. The nuances of a scheme and its location are taken in to account in any assessment.

Consultation Feedback

6.47 As discussed in Chapter 2: EIA Process and Methodology, consideration has been given in this assessment to the formal EIA Scoping Opinion comments provided by the LBC and consultees in respect to the proposed development. These key considerations are summarised in Table 6.1.

Table 6.1: EIA Scoping Consultation Feedback

Consultee	Comment	Where in the Chapter this comment is addressed
LBC	Workspace supply and demand analysis specific to the locality should be included, including discussion on the types of employment spaces. In particular consideration should be given to demand for workshop/studio/maker type spaces. The assessment should identify, using an evidence base, of the impact of the commercial space within the development on specific kinds of businesses users.	Baseline Conditions section (Economic/Business Baseline and Office and Start-up Space) Potential Impacts and Likely Effects section (Business Space and Activity
LBC	Consideration of the jobs in the demolition and construction phase should reflect the fact that the Council will require the recruitment of one apprentice per £3million of built costs, through the Kings Cross Construction Skills Centre, as well as a number of work experience placements.	Potential Impacts and Likely Effects section (Construction Apprentices)
LBC	Consideration of the impact of the completed development should include assessment of the impact of the commercial component on local business activity. For instance an assessment of the extent to which the scheme will support or create a collaborative business eco system and the ways in which the development's different business typologies will have an impact on each	Potential Impacts and Likely Effects section (Business Space and Activity)

[24] Homes and Communities Agency, 2014. Additionality Guide 4th Edition. London. Homes and Communities Agency.

[25] Homes and Communities Agency, 2015. Employment Density Guide 3rd Edition. London. Homes and Communities Agency.

Table 6.1: EIA Scoping Consultation Feedback

Consultee	Comment	Where in the Chapter this comment is addressed
	other and the existing business environment in Camden Town. Economic operational effects should include the local impact of the spending power of the new on-site workforce.	
LBC	Assessment of the impact of the mix of housing tenures and sizes on housing need should be provided.	Baseline Conditions section (Housing) Potential Impacts and Likely Effects section (Housing Provision)
LBC / Camden & Islington Public Health (CIPH)	It is increasingly recognised that the built environment can have an impact on both physical and mental health and wellbeing, and that individual actions to improve lifestyle or health status are likely to be influenced by the environmental and socioeconomic context in which they take place. The CIPH recommends that the HIA is prepared with reference to the NHS Camden Health Checklist for Planning, Camden Planning Guidance 6: 'Amenity' and Camden's Joint Health and Wellbeing Strategy (2016-2018), where relevant priorities are likely to be "Healthy Weight, Healthy Lives", and "Ensuring good mental health for all" (Camden Local Plan (Submission draft) 2016 Policy C1c). It is considered that the ES socio-economic considerations should therefore be broadened to incorporate the HIA, which would include more wide-ranging consideration of the impact of the development on improving health and wellbeing and reducing inequalities, within a focus on a health promoting environment.	A separate Health Impact Assessment (HIA) has been prepared and accompanies the application.
LBC / CIPH	Consideration should be given to how the proposed development could encourage physical activity through an environment that facilitates walking and cycling, active play, and other opportunities for accessible physical activity, including use of the Healthy Streets component of Transport for London's Transport Action Plan, "Improving the health of Londoners".	Potential Impacts and Likely Effects section (Open Space and Recreation Facilities)
LBC / CIPH	The ES should consider the proposed development's impact on access to healthcare provision (GP Surgeries, etc.). Local provision of facilities should be scoped within one mile (1.6 km) of walking distance rather than 'as the crow flies' and the NHS Digital (https://digital.nhs.uk/) which publishes up to date statistics on the number of Full Time Equivalent GPs at each surgery should be used. The CIPH should be approached for up to date information on smaller practices.	Baseline Conditions section (Health Baseline) Potential Impacts and Likely Effects section (Health)

6.48 Consultation was also undertaken with a Senior Officer of the Strategy & Change, Corporate Services at LBC regarding education. The consultation confirmed that the data used to inform this assessment is current and the latest available. A more detailed understanding of school catchments, future capacity and resulting pressures on demand was provided by LBC. This information has been included in the following assessment.

Assessment Methodology

6.49 The following section outlines the methodologies applied to identify and assess the potential socio-economic impacts and likely effects to result from the proposed development.

Study Area

6.50 A baseline of the socio-economic conditions of the area has been produced. This draws on national data sets and Camden specific data. It provides the context against which the impacts of the scheme are assessed.

6.51 Given the nature of the assessment in this chapter, three scales of impact area were considered namely the neighbourhood area, local area and wider area:

- The neighbourhood impact area covers Haverstock ward and Camden Town with Primrose Hill ward;
- The local impact area covers the LBC;
- The wider impact area covers London as a whole. This is especially relevant to economic impacts.

6.52 This socio-economic chapter have assessed the impacts and effects of the proposed development against the existing socio-economic conditions at these scales.

6.53 The neighbourhood area varies by receptor due to the nature of potential effects as follows:

- For effects on the economy, business space and economic activity, open and recreational spaces and crime, the neighbourhood area covers the two wards of Camden Town with Primrose Hill and Haverstock.
- For effects on educational facilities, the neighbourhood area covers primary schools that lie within the relevant primary planning area (Planning Area 3 – PA3) and secondary schools across LBC. The Education Act 1996, section 444(5)[26] is also considered, which suggests that 2 miles (3.2 km) for a child under eight years old and 3 miles (4.8 km) for a child over eight years old can be considered to be "walking distance" for a local school. The assessment considers which of the local schools lie within a 3.2 km and 4.8 km walking distance based on a conservative and indicative assumption that it takes 30 minutes to walk 3.2 km and 45 minutes to walk 4.8 km. Distances are quoted in imperial as per original guidance.
- For effects on healthcare facilities, the neighbourhood impact area covers a 1 mile (1.6 km) walking distance from the application site for GP surgeries; a 0.5 mile (0.8 km) walking distance for dental practices and opticians; and pharmacies within the two wards of Camden Town with Primrose Hill and Haverstock. These are based on the Scoping Opinion and consideration of appropriate geographies for access to other local health services.

6.54 Impacts on a national level were considered as appropriate and national data in the baseline was considered for comparative purposes. For example, health rates of the local population were compared to the local and wider impact area.

[26] Education Act 1996 c. 56. 1996.Available at: http://www.legislation.gov.uk/ukpga/1996/56/contents

Baseline Characterisation

6.55 Baseline socio-economic conditions for each indicator assessed within this chapter were established through the interpretation of the following nationally recognised research, statistics and survey information:

- **Economy** - This comprised an analysis of the business base, employment, economic activity, unemployment, deprivation, occupations and skills, average salaries and number of jobs. The analysis drew on sources including UK Business Counts[27], Camden Employment Land Study[28], Census data[29,30], Camden's Joint Strategic Needs Assessment (JSNA)[31], Annual Population Survey (APS)[32], Jobseeker's Allowance (JSA) by Occupation[33], Annual Survey of Hours and Earnings (ASHE)[34], Business Register and Employment Survey (BRES)[35] and the 2015 Index of Multiple Deprivation (IMD)[36];
- **Housing** - This comprised analysis of evidence on existing housing stock, housing targets for market and affordable homes. Information was gathered utilising Census data[37,38], the Draft Local Plan and Camden Strategic Housing Market Assessment (SHMA)[39]. The recent delivery of affordable homes and future anticipated delivery rates were based on evidence from the LBC Authority Monitoring Report (AMR)[40];
- **Education** - This comprised gathering and interpretation of education provision data from the Camden Annual School Places Planning Report[41] and via consultation with a Senior Officer of the Strategy & Change, Corporate Services at LBC;
- **Health** - This comprised assessment of the characteristics of the local population using national Census data[42,43], Public Health England's Active People Survey[44], 2015 IMD[45] and CIPH information on local GP surgeries within a 3.2 km walking distance, NHS information on dental surgeries, hospitals and opticians[46], and evidence published by the Camden Health and Wellbeing Board on pharmacies[47];
- **Open Space and Children's Playspace -** This comprised identification of the current provision of open space and any gaps in existing provision were identified drawing on Camden's Open Space, Sport and Recreation Study 2014[48]; and
- **Crime** - This comprised a review of information set out in the Design and Access Statement (DAS) for the proposed development, which provides some background information on crime within and around the application site, and a review of evidence from the 2015 IMD[49] and the Home Office[50] of the current levels of crime at the neighbourhood and local levels.

Method of Assessment

6.56 Economic impacts have been assessed by drawing on national data sets, Government guidance and details of the proposed development. The economic impacts of the proposed development were assessed in two stages:

- Demolition and construction stage – assessment of employment and economic productivity of construction activity; and
- Completed development stage – assessment of employment, productivity, population, labour force and skills, business space and activity, housing, incomes and local spending, education, healthcare, open space and recreation facilities, children's playspace and crime.

Demolition and Construction Stage

6.57 The process for the modelling of effects derived from the proposed development during the demolition and construction stage is set out below.

- **Employment** - In order to calculate the number of jobs (net Full Time Equivalent (FTE) employment) generated through construction of the proposed development total construction costs were estimated using BCIS Build Cost data[51] and divided by the average turnover per employee in the construction sector in London, drawn from the Business Population Estimates (BPE)[52]. This calculates the number of employees generated directly by the construction programme if it were to be completed in a single year:

$$\frac{Construction\ costs}{Average\ turnover\ per\ employee\ in\ London} = Number\ of\ construction\ employees$$

This was then divided by the anticipated length of the construction period to identify gross full time equivalent (FTE) jobs.

$$\frac{Number\ of\ construction\ employees}{Construction\ period\ (years)} = Gross\ FTE\ jobs$$

Allowances for leakage and displacement were made in line with recognised guidance[53] in order to calculate net FTE jobs generated by the proposed development. A multiplier was also applied to allow for employment indirectly generated from the proposed development during the demolition and construction stage, such as supply chain linkages or the value of contracts to local firms[54].

$$Gross\ FTE\ jobs - (Leakage + Displacement) \times Mutipler = Net\ additional\ jobs$$

- **Economic Productivity** - In order to calculate the uplift in productivity (Gross Value Added – GVA[55]) generated through construction of the proposed development, the average GVA per FTE worker was

[27] Office for National Statistics, 2016. UK Business Counts – Enterprises [public dataset]. London. Office for National Statistics.
[28] URS, 2014. London Borough of Camden Employment Land Study Final Report. London. URS.
[29] Office for National Statistics, 2011. Census UK [public dataset]. London. Office for National Statistics.
[30] Office for National Statistics, 2001. Census UK [public dataset]. London. Office for National Statistics.
[31] London Borough of Camden, 2013. Joint Strategic Needs Assessment 2014/15. London. London Borough of Camden
[32] Office for National Statistics, 2017. Annual Population Survey [public dataset]. London. Office for National Statistics.
[33] Office for National Statistics, 2017. Jobseekers Allowance [public dataset]. London. Office for National Statistics.
[34] Office for National Statistics, 2016. Annual Survey of Hours and Earnings (ASHE) [public dataset]. London. Office for National Statistics.
[35] Office for National Statistics, 2015. Business Register and Employment Survey (BRES) [public dataset]. London. Office for National Statistics.
[36] Department of Communities and Local Government, 2015, Indices of Multiple Deprivation [public dataset]. London. Department of Communities and Local Government.
[37] Office for National Statistics, 2011. Census UK [public dataset]. London. Office for National Statistics.
[38] Office for National Statistics, 2001. Census UK [public dataset]. London: Office for National Statistics.
[39] Opinion Research Services, 2016. London Borough of Camden Strategic Housing Market Assessment. London. LBC.
[40] London Borough of Camden, 2015. Authority Monitoring Report 2014/15. London: London Borough of Camden
[41] London Borough of Camden, 2016. 2016 Annual School Places Planning Report Primary - Secondary. London. LBC.
[42] Office for National Statistics, 2011. Census UK [public dataset]. London: Office for National Statistics.
[43] Office for National Statistics, 2001. Census UK [public dataset]. London: Office for National Statistics.
[44] Public Health England, 2015. Active People Survey: Excess weight data for the Public Health Outcomes Framework (2013 –2015). London. Public Health England.
[45] Department of Communities and Local Government, 2015, Indices of Multiple Deprivation. London. Department of Communities and Local Government
[46] National Health Services, 2017. NHS Choices [online dataset]. London. National Health Services available at: http://www.nhs.uk/pages/home.aspx
[47] Camden Health and Wellbeing Board, 2015. Pharmaceutical Needs Assessment. London. National Health Services.
[48] Atkins, 2014. Camden's Open Space, Sport and Recreation Study. London. London Borough of Camden
[49] Department of Communities and Local Government, 2015. Indices of Multiple Deprivation [public dataset]. London. Department of Communities and Local Government.
[50] Home Office, 2017. ASB Incidents Crime and Outcomes [public dataset]. London. Home Office.
[51] Building Cost Information Service, 2017. Average Prices [online tool]. London. RICS.
[52] Department for Business, Innovation and Skills, 2016. Business Population Estimates [public dataset]. London. Office for National Statistics.
[53] Homes and Communities Agency, 2014, Additionality Guide 4th Edition. London. Homes and Communities Agency
[54] *Ibid*
[55] Note: GVA measures the value of output created (i.e. turnover) net of inputs purchased, and is used to produce a good or service (i.e. production of the output)

calculated using Experian local market forecasts[56]. This was applied to the net FTE construction jobs estimated to be generated by the proposed development.

Completed Development Stage

6.58 Completed development effect is the difference between the effect of the current on-site activity (existing supermarket and associated office floorspace in supermarket) and the effects that are expected to be generated by the proposed development once completed and occupied. This is referred to as the net additional effects of the proposed development. The process for the modelling of socio-economic effects over the long-term that have been adopted for the assessment is set out below.

- **Employment** – The direct jobs associated with the current and proposed Morrisons supermarket were provided by the Applicant. For other proposed uses, floorspaces were applied to the relevant employment densities following national guidance[57] to calculate the respective number of direct gross FTE jobs. Appropriate allowances for leakage and displacement were made[58] in order to calculate a net figure of FTE job creation. Leakage is informed by travel to work data from Census 2011 and applied in line with national guidance. A multiplier is applied to calculate indirect and induced employment impacts.
- **Productivity** - In order to calculate the uplift in GVA productivity generated through the completed development stage, the average GVA per employee was drawn from Experian local market forecasts[59], with this average applied to the jobs generated by the proposed development during the completed development stage.
- **Population, Labour Force and Skills** - The total population was estimated by multiplying the average number of persons per bedroom for the local impact area (as defined in Figure 1.1) by the number of new homes proposed by bedroom, as recorded by the 2011 Census[60]. Evidence from the Annual Population Survey[61] sets out the proportion of economically active and employed residents in the local impact area, which was then applied to the uplift in population as a result of the proposed development to provide an illustration of population impacts. The skills and qualifications of the employed residents were estimated based on the 2011 Census.
- **Business Space and Activity** – A qualitative assessment of the impacts on business space and activity was undertaken by means of interpretation of published evidence of the supply and demand of business and workspace and the economic benefits of agglomeration and supporting small businesses through the creation of affordable business space, as well as the application of professional judgement and experience.
- **Housing Provision** – The impact of the proposed development on housing supply was established by comparing the amount of new housing against the annual housing target set out in the emerging Camden Local Plan and current market affordability.
- **Incomes and Local Spending** - The additional household income was calculated by multiplying the total additional economically active population (in employment) by average (median) earnings at the local impact area level, utilising ASHE data[62]. This was disaggregated by occupational group. Additional spending power on convenience and comparison goods was calculated by multiplying the number of additional households by household expenditure for leisure, convenience and comparison goods, utilising expenditure data published by Oxford Economics via Pitney Bowes[63]. A report published by the Home Builders Federation (HBF)[64] was used to estimate first occupation expenditure. High level assumptions on the proportion of the operational on-site workforce that would generate expenditure locally and the amount spent each working day were made to estimate the total expenditure generated as a result of the direct jobs associated with the proposed development.
- **Local Authority Revenue –** The potential council tax revenues were calculated based on an assessment of the likely average current market value of dwellings included within the proposed development. Dwellings were then assigned to council tax valuation bands with a calculation made of the annual council tax revenues accruing from the proposed development on an annual basis utilising the LBC Council Tax Charges[65]. The New Homes Bonus payment calculation represents the amount payable from the Government to LBC as a result of the proposed development, and was calculated using an online tool provided by DCLG[66]. This generated a total resulting payment over a 1 year and 4 year period. Business rates revenue was estimated based on the likely rateable value of new commercial space, drawing on VOA data[67] for similar properties locally.
- **Education -** The effect of the proposed development on the requirement for education provision is dependent upon the number of additional children of school age generated by the delivery of the proposed development. This was achieved by calculating the number of primary and secondary children that would form part of the new on site residential population and by considering capacity within primary and secondary schools local to the application site. Local primary schools assessed were those that lie within the relevant primary planning area (Planning Area 3 – PA3), whilst secondary analysis included all schools across LBC. This analysis determined whether the existing facilities can accommodate an increase in school aged children envisaged. The expected number of children residing in proposed development was calculated using the Camden Survey of New Housing (2002-08) child yield methodology[68] and refined to estimate the number of primary aged and secondary aged children only. The findings of the assessment were shared with and considered by a Senior Officer of the Strategy & Change, Corporate Services at LBC.
- **Healthcare** - Impacts on the health profile of the local population were considered. The capacity of GP (1 mile) and dental facilities (0.5 miles) in proximity to the application site were analysed. Assessment of capacity was undertaken by LBC Public Health team. The assessment also sought to understand whether new patients are being accepted at existing facilities. The local provision of pharmacies, hospitals and opticians was also considered. An HIA accompanies the application and explores the health and wellbeing impacts in more detail.
- **Open Space and Recreation Facilities** – Impacts were based on applying LBC open space requirements per 1,000 residents, as set out in Policy A2 Open Space of the Draft Local Plan, to the estimated population of the proposed development and compared to local provision.
- **Children's Playspace** – The number of children (aged 0 – 18 years) expected to reside on the proposed development was calculated using the Camden Survey of New Housing (2002-08) child yield methodology[69]. The child yield was then assessed against the provision of playspace within the proposed development based on the requirements set out in the GLA's SPG on Play and Informal Recreation.
- **Crime -** The latest data on crimes in the neighbourhood and local impact areas is published by the Home Office. This information was used to gain an understanding of the scale of crime currently within the areas and how the development of the application site and the design of the proposed development could impact current crime levels.

[56] Experian, 2017, Local Market Forecast Quarterly [dataset, not publically available]. London. Experian Ltd.
[57] Home and Communities Agency, 2015, Employment Density Guide 3rd Edition. London. Home and Communities Agency
[58] Homes and Communities Agency, 2014, Additionality Guide 4th Edition. London. Home and Communities Agency
[59] Experian, 2017, Local Market Forecast Quarterly [dataset, not publically available]. London. Experian Ltd.
[60] Office for National Statistics, 2011. Census UK [public dataset]. London. Office for National Statistics.
[61] Office for National Statistics, 2016. Annual Population Survey [public dataset]. London. Office for National Statistics.
[62] Office for National Statistics, 2016. Annual Survey of Hours and Earnings (ASHE) [public dataset]. London. Office for National Statistics.
[63] Oxford Economics, 2017 Household Expenditure [dataset, not publically available]. London. Oxford Economics.
[64] Home Builders Federation & NLP, 2015. The Economic Footprint of UK House Building, London. Home Builders Federation.
[68] Correspondence between Turley and Gavin Sexton, Principal Planner at LBC on 11/05/2017 confirmed that LBC's education department relies on the Camden Survey of New Housing (2002-08) child yields for estimating the number of children expected to reside on new developments.
[69] Correspondence between Turley and Gavin Sexton, Principal Planner at LBC on 11/05/2017 confirmed that LBC's education department relies on the Camden Survey of New Housing (2002-08) child yields for estimating the number of children expected to reside on new developments.

Significance Criteria

6.59 The assessment of likely effects refers to the change that is predicted to take place relative to the existing baseline position, as a result of the proposed development. The assessment involved estimating the absolute change that is likely to occur from the proposed development in relation to key socio-economic receptors as set out in the baseline.

6.60 The significance of an effect has been determined as the combination of the 'sensitivity' of the affected receptor and the predicted 'magnitude' of the impact. The sections below summarise the definitions of sensitivity and magnitude, and set out the assessment matrix applied to bring both considerations together.

6.61 It should be noted that there is no set guidance on the technical significance criteria that should be applied when undertaking a socio-economic assessment. Furthermore, the diversity and often qualitative nature of socio-economic receptors and the information that informs them precludes overly specific catch-all assessment criteria. Therefore the assessment of significance of socio-economic effects relied on professional judgement. Professional judgement is informed by the robust analysis of baseline and impact data and past experience of the assessors.

Receptor Sensitivity

6.62 The sensitivity of receptors is determined by a comparison to wider regional and national trends, unless otherwise stated. Through observation of the scale of receptors' severity and capacity for change relative to wider comparator areas and/or national standards, the sensitivity of receptors locally can be observed. Consideration is also given to the priority placed on specific receptors in strategy and policy terms, particularly in the case of more qualitatively based receptors and those where there may be a shortage of quantitative evidence. Table 6.2 describes the sensitivity criteria that have been used in this assessment.

Table 6.2: Sensitivity Criteria

Sensitivity	Description of Criteria
Very High	Receptors that are highly sensitive to change with little or no ability to absorb change without fundamentally altering its present character. The present baseline position demonstrates an underperformance relative to comparator areas or national standards, resulting in the receptors being of very high socio-economic value and/or are a policy priority.
High	Receptors that are sensitive to change with low ability to absorb change without fundamentally altering its present character. The present baseline position demonstrates a relatively weak baseline performance relative to comparator areas or national standards, resulting in the receptors being of high socio-economic value and/or are a policy priority.
Medium	Receptors that are moderately sensitive to change with moderate capacity to absorb change without significantly altering its present character. The present baseline position demonstrates an average/slightly below average performance relative to comparators or national standards. The receptor has some socio-economic value and/or may appear in policy but not as a priority.
Low	Receptors that have a low sensitivity to change and is tolerant of change without detriment to its character. The present baseline position demonstrates an above average performance relative to comparator areas or national standards. Such receptors are of low socio-economic value and/or may be referenced in policy but are not accorded priority.
Very Low	Receptors with a very low sensitivity are resistant to change and the present baseline position demonstrates a strong performance relative to comparators or national standards. The receptors are of no socio-economic value and do not appear in policy.

6.63 As mentioned previously, the diverse nature of socio-economic indicators precludes overly specific catch-all sensitivity criteria. Consequently, more detailed reasoning and justification for assessed sensitivity is provided for each receptor within the Baseline Conditions section.

Magnitude of Impact

6.64 Magnitude is assessed by examining the scale of the baseline impact that is attributable to the proposed development. The descriptions of the magnitude criteria that have been used in this assessment are shown in Table 6.3.

Table 6.3: Magnitude Criteria

Magnitude	Description of Criteria
Very High	Substantial permanent change in baseline conditions that would significantly alter the provision or quality of receptors
High	Large scale, most likely permanent, change in socio-economic baseline that would affect the provision or quality of receptors
Medium	Notable change in baseline conditions above or below that which would otherwise be expected which is likely to affect the provision or quality of receptors in an ongoing but not necessarily permanent nature
Low	Some measurable, likely reversible, change in socio-economic characteristics which may affect the provision or quality of receptors
Very Low	Unmeasurable/negligible change in baseline conditions with no/almost no chance for knock-on effects to provision or quality of receptors

6.65 As mentioned previously, the diverse nature of socio-economic indicators precludes overly specific catch-all sensitivity criteria. Consequently, more detailed reasoning and justification for assessed magnitude is provided for each receptor within the Potential Impacts and Likely Effects section.

Significance of Effects

6.66 Magnitude and sensitivity have been combined to determine the overall significance of effects as shown in Table 6.4. The effects can be either adverse or beneficial, depending on the receptor assessed and the nature of the effect. The assessment identifies whether the effects are beneficial or adverse for each receptor along with the significance.

Table 6.4: Significance of Effects Criteria

Sensitivity	Magnitude				
	Very High	High	Medium	Low	Very Low
Very High	Major	Major	Moderate	Minor	Minor
High	Major	Moderate	Minor	Minor	Negligible
Medium	Moderate	Minor	Minor	Negligible	Negligible
Low	Minor	Minor	Negligible	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible	Negligible

6.67 For the purposes of this assessment, any effect above minor (e.g. moderate or major) is considered to be significant in EIA terms.

Duration of Effects

6.68 The duration of effects have been taken into consideration when determining the overall significance of the effects. The timescales that have been used are presented in Table 6.5.

Table 6.5: Duration of Effects Criteria

Timescale	Definition
Short term	0 to 5 years
Medium term	5 to 15 years
Long term	15 + years

Assumptions and Limitations

6.69 This assessment is largely based on a desk study and is therefore reliant on published data and information. Despite the limitations, there has been an appropriate level of information available to allow for a robust assessment, and assumptions have been made in line with professional judgement and experience in completing socio-economic ES chapters for other mixed use schemes. Conclusions have also been informed by stakeholder engagement and consultation.

6.70 The following assumptions and limitations are relevant to this chapter:

- The assessment of demolition and construction stage employment and GVA impacts has drawn on cost estimates from BCIS and indicative development programme information. Although BCIS is a leading provider of cost and price information for the UK construction industry, the costs estimated using this data have the potential to be higher or lower than the eventual costs associated with the proposed development. This would respectively result in a higher or lower number of construction jobs. Furthermore, the assessment recognises that both the scheme details, costs and development programme could be subject to revision as the proposed development progresses.
- The net additionality assessment, which has drawn upon the assessment of demolition and construction stage employment and GVA impacts, has made assumptions on appropriate levels of leakage, displacement and multipliers. Although these assumptions have been made in line with robust and accepted guidance, there is potential for the assessment to over account or under account for the net additional effects associated with the proposed development.
- Completed development stage impacts have been based on the most up-to-date scheme details. In common with demolition and construction stage information, the proposed development details could be subject to further revisions as the proposed development progresses to detailed design stage and market conditions change, which may influence the level of completed development stage impact. Again the professional assumptions made to assess the net additional employment and productivity impacts may have a margin of error relative to the eventual operational impacts once these are realised.
- Assumptions relating to the cumulative developments have been based on the most up-to-date details available. However, as these cumulative developments, as agreed with through consultation with LBC, are being delivered by external organisations, a degree of professional judgement is required for some assumptions, such as the development timeframes and operational activity where such details are not known.

Baseline Conditions

Current Baseline

6.71 This section summarises the characteristics of the existing socio-economic conditions of the application site, neighbourhood, local and wider impact areas, with the national characteristics presented for comparison. The assessment of baseline conditions examines the current position and extent to which key receptors have changed over time. The information provides the baseline against which the potential impacts and likely effects of the proposed development have been assessed.

Application Site

6.72 The application site occupies an area of 3.26 ha and is made up of the following two parcels of land divided by a railway line as shown in Figure 6.1:

- the MS parcel; and
- the PFS parcel.

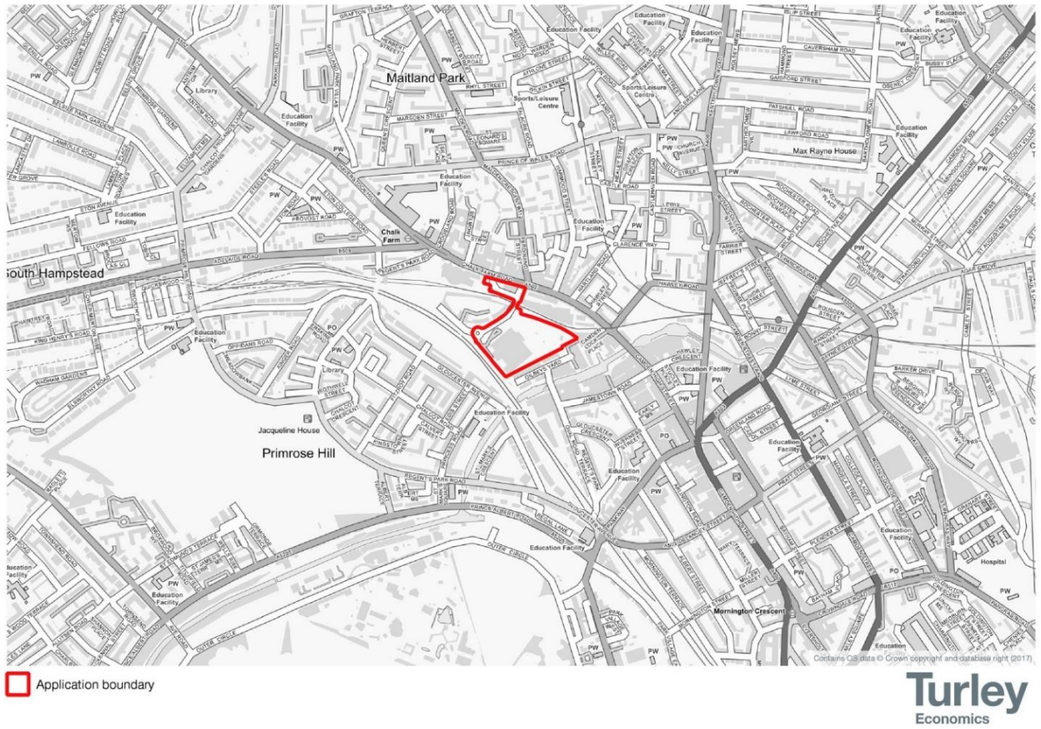

Figure 1: Application Site Location

6.73 The Camden Town London Underground Station is located approximately 500 m to the east, whilst Chalk Farm London Underground Station is located approximately 400 m to the west. Both of these stations are served by the Northern line. Kentish Town West Rail Station is located approximately 600 m to the north.

6.74 Based on evidence provided by the Applicant, the existing uses of the application site currently supports 58 full time jobs and 153 part time jobs.

Economic/Business Baseline

6.75 The local impact area of LBC contains 27,370 business enterprises[70]. This is equivalent to around 5.7 % of the 476,890 business enterprises recorded across London (wider impact area) in 2016. Data at the neighbourhood impact area is not available due to disclosure issues.

6.76 The majority of businesses in the local impact area are 'micro' businesses (employing 0 – 9 people) at 87.8 %, although this is a slightly lower proportion than on average across the wider impact area (90.6 %) and England (89.3 %). Correspondingly, the local impact area contains a higher proportion of 'small' (10 – 49 employees), 'medium-sized' (50 – 249 employees) and 'large' (250+ employees) business enterprises relative to the wider impact area, where small businesses comprise just 7.5 %, medium-sized businesses 1.5 % and large businesses 0.4 %.

Office and Start-up Space

6.77 Key findings regarding local office supply and demand in Camden, identified within the Camden Employment Land Study[71], prepared by URS Aecom in 2014, are:

- Camden Town is characterised by small local office space and is the location for the majority of LBC's local office provision;
- In Camden Town a number of new mixed use developments providing B1 space at ground and first floor levels suitable for accommodating local office provision were recorded;
- All clusters of local office provision have high active occupancy rates in locations with good quality building stock and surrounding environment, located close to public transport connections and in close proximity to adequate public amenities. Levels of office vacancy were assessed to be low throughout LBC; and
- Demand for local office space is stable within LBC and supply can be said to be meeting demand.

6.78 The following conclusions were drawn regarding workspace hubs and small business space:

- There are at least 14 workspace providers in Camden which have a range of capacity from 32 to 400 desks or 18 units to 40 units;
- These premises provide office space mainly, which typically meets the needs of digital tech, communication and media and consultancy businesses. There is a range of other types of space which is set up for artists, designers, crafts and specialists such as life sciences;
- Anecdotally, the shortage of affordable and readily useable workspace is hindering the growth of SMEs. There is a general belief that these spaces will become more common in the next few years as the market responds to demand, and start up and small businesses realise that these spaces can offer an affordable way for entrepreneurs to test their ideas;
- Anticipated increase in demand of smaller start up space from two Camden growth sectors: medical and life science (following construction of Francis Crick Institute) and technology, media and telecommunications (TMT); and
- Overall conclusions are that the format of start-up small business space is high in demand, particularly for open co-working space.

6.79 The Camden Employment Land Study[72] identifies Camden's unique position, partly within and on the fringe of the CAZ.

Employment

6.80 In 2015, the business base of the local impact area provided employment for around 340,000 people, including 20,000 people in the neighbourhood impact area[73]. The distribution of employee jobs by industry in the neighbourhood, local and wider impact areas is summarised in Table 6.6.

6.81 The largest share of employee jobs in the neighbourhood impact area are in the information and communication industry, providing 3,650 employee jobs (18.3 % of total employee jobs). This is proportionally higher than the local impact area (10.6 %) and wider impact area (7.8 %). This is followed by employees in professional, scientific and technical roles (3,300 jobs), accommodation and food services (2,700) and retail (2,500 jobs).

6.82 The local impact area also has an above average representation of employee jobs (when compared to the London average) in a number of sectors:

- Information and communication – 18.3 % compared to 7.8 % across London;
- Accommodation and food services – 13.5 % compared to 7.6 % across London;
- Retail - 12.5 % compared to 8.7% across London;
- Professional, scientific and technical - 16.5 % compared to 13.6 % across London; and
- Arts, entertainment, recreation and other services – 7.1 % compared to 4.9 % across London.

Table 6.6: Employee Jobs by Industry 2015

Industry	Neighbourhood Impact Area		Local Impact Area	Wider Impact Area	England
Agriculture, forestry & fishing	0	0.0%	0.0%	0.0%	0.6%
Mining, quarrying & utilities	200	1.0%	0.5%	0.6%	1.1%
Manufacturing	425	2.1%	1.2%	2.3%	8.1%
Construction	340	1.7%	2.1%	2.8%	4.5%
Motor trades	20	0.1%	0.2%	0.8%	1.8%
Wholesale	650	3.3%	1.8%	3.0%	4.2%
Retail	2,500	12.5%	5.6%	8.7%	9.8%
Transport & storage (inc postal)	205	1.0%	2.9%	4.6%	4.7%
Accommodation & food services	2,700	13.5%	8.2%	7.6%	7.0%
Information & communication	3,650	18.3%	10.6%	7.8%	4.4%
Financial & insurance	265	1.3%	3.2%	7.2%	3.6%
Property	850	4.3%	2.4%	2.7%	1.7%
Professional, scientific & technical	3,300	16.5%	22.1%	13.6%	8.7%
Business administration & support services	1,150	5.8%	9.1%	10.7%	9.1%
Public administration & defence	800	4.0%	3.5%	4.4%	4.1%
Education	800	4.0%	9.7%	7.9%	9.2%
Health	1,150	5.8%	11.5%	10.2%	12.8%
Arts, entertainment, recreation & other services	1,425	7.1%	5.9%	4.9%	4.4%
Total	20,000	100%	100%	100%	100%

Source: Business Register and Employment Survey 2015

[70] Office for National Statistics, 2016. UK Business Counts – Enterprises [public dataset]. London. Office for National Statistics.
[71] URS, 2014. London Borough of Camden Employment Land Study Final Report. London. URS.
[72] URS, 2014. LBC Employment Land Study Final Report. London. URS.
[73] Office for National Statistics, 2015. Business Register and Employment Survey. London. Office for National Statistics.

Economic Productivity

6.83 Productivity, measured by GVA, is a key indicator of the economic performance of an area. In the local impact area, FTE employment generates productivity of approximately £101,082[74] per year on average across all sectors, whilst at the wider impact area and UK scales, this is recorded at £80,792 and £59,847, respectively. This suggests greater productivity per FTE worker at the local level.

6.84 The construction sector is recognised to generate a higher level of productivity per FTE employee, at £155,206 in the local impact area, which is 1.3 times higher than the UK average GVA per FTE for the construction sector.

6.85 Over the period from 2004 – 2014, productivity has seen notable growth in the local impact area, at 23.1% over the 10 year period. This is higher than the 15.9 % GVA growth seen across the wider impact area of London over the same period and the decline in GVA recorded across the UK. Table 6.7 compares the productivity change of each impact area of the construction sector against all other sectors.

Table 6.7: Construction and All Sectors GVA

Spatial Scale	Construction Sector		All Sectors	
	GVA per FTE	GVA % Change 2004 - 2014	GVA per FTE	GVA % Change 2004 - 2014
Local Impact Area	£155,206	69.6%	£101,082	23.1%
Wider Impact Area	£102,075	37.7%	£80,792	15.9%
United Kingdom	£66,534	14.0%	£59,847	-5.3%

Source: Experian Local Market Forecasts 2016

Earnings

6.86 Earnings can provide an indication of the strength of the local economy, given their relationship with wider economic factors such as GVA and productivity. Earnings levels also have a relationship with prosperity and as such the economic well-being of residents and their propensity to engage in sports and other cultural activities.

6.87 Table 6.8 summarises average (median) earnings for full-time workers in the local and wider impact areas and England, sourced from the ASHE[75]. ASHE data is unavailable at the ward level and so is not presented for the neighbourhood impact area. Weekly and annual pay for residents in each location is provided.

6.88 The most recent ASHE data for the local impact area shows that there has been a greater increase in annual pay (gross), equivalent to £4,686 or 13.3 %, compared to the wider impact area (6.0 %) and England (7.6 %). The median earnings within the local impact area are above average for the wider impact area and England.

Table 6.8: Median Earnings and Hours Worked 2016

Spatial Scale	Annual Pay (gross)				Hours Worked (weekly 2016)
	2010	2016	Change	% Change	
Local Impact Area	£35,110	£39,796	+ £4,686	13.3%	37.5
Wider Impact Area	£31,852	£33,776	+ £1,924	6.0%	37.5
England	£26,500	£28,503	+ £2,003	7.6%	37.5

Source: Annual Survey of Hours and Earnings 2016

6.89 Whilst evidence suggests that growth in median earnings is strong, the Affordable Housing Statement for the proposed development demonstrates that there has been instability in the lower quartile earnings of full-time employed residents of the local impact area over recent years, with little evidence of a growth in earnings.

Population

6.90 The population of the neighbourhood impact area in 2011 was 24,977, with this figure increasing by 9.6 % (approximately 2,179 residents) over the previous 10 year period since 2001.

6.91 The population of the neighbourhood impact area has grown at a slower rate than the local and wider impact areas, at 11.3 % and 14.0 % respectively, albeit at a faster rate than the national average (7.9 %).

Age Structure

6.92 Age is an important indicator in determining the number of residents of working age (16 – 64) who can potentially contribute to the labour force.

6.93 Table 6.9 presents the Age Profile for the study area in 2011. In 2011 there were 17,823 residents, or 71.4 % of the population, in the neighbourhood impact area aged 16 to 64. This proportion of working age residents is marginally lower than the local impact area, at 73.0 %, but higher than the averages across the wider impact area and England, at 69.1 % and 64.8 %, respectively. This indicates that just less than two thirds of the population are of working age.

6.94 The working age population in the neighbourhood impact area has grown by 11.6 % since 2001 – representing an increase of an approximate additional 1,852 residents. This is similar to the local average (11.8 %) and higher than the national average (9.2 %), yet lower than the proportional increase in the working age population seen across the wider impact area, at 16.8 %.

Table 6.9: Age Profile 2011

Spatial Scale	15 years and under	16 to 44	45 to 64	65 years and over
Neighbourhood Impact Area	17.4%	51.4%	20.0%	11.2%
Local Impact Area	16.1%	53.6%	19.4%	10.9%
Wider Impact Area	19.9%	47.9%	21.2%	11.1%
England	18.9%	39.4%	25.4%	16.3%

Source: Census 2011

6.95 Camden's Joint Strategic Needs Assessment (JSNA[76]) predicts that Camden's population is expected to rise to 246,100 by 2023, an increase of 8.5 %. This compares with an average increase of 9.9 % in London. People aged 45+ years are expected to account for the largest absolute increase to 2023, with residents aged 75+ years expected to see the greatest proportional increase. Younger age groups are expected to increase at the lowest rates - 16-24 year olds (0.5 %), 0-3 year olds (2.3 %) and 4-10 year olds (3.0 %).

Economic Activity and Unemployment

6.96 As shown in Table 6.10, the latest Annual Populations Survey (APS[77]), suggests that a lower proportion of working age residents (aged 16 – 64) in the local impact area are economically active, at 73.2 %, relative to the average for the wider impact area, at 78.3 %, and the level of 78.1% across England. A higher proportion of economically inactive residents in the local impact area want a job (35.1 %) compared to the wider and national averages of 25.9 % and 24.1 %.

[74] Based in a five year average (2012-2016) of GVA per FTE employee.
[75] Office for National Statistics via Nomis, 2016. Annual Survey of Hours and Earnings. London. Office for National Statistics.
[76] London Borough of Camden, 2013. Joint Strategic Needs Assessment. London. London Borough of Camden
[77] Office for National Statistics, 2017. Annual Population Survey. London. Office for National Statistics.

6.97 The employment rate across the local impact area (70.0 %) is also lower than the wider and national averages, of 73.6 % and 74.1 % respectively. However, the unemployment rate is lower in the local impact area (4.4 %) compared to the wider impact area (6.1 %). These figures could be explained by the higher student population.

Table 6.10: Economic Activity Residents Aged 16-64 (October 2015-September 2016)

Indicator	Local Impact Area	Wider Impact Area	England
Economically active residents (16-64)	124,700	4,630,300	26,934,500
Economic activity rate	73.2%	78.3%	78.1%
Employed residents	119,200	4,349,700	25,562,700
Employment rate	70.0%	73.6%	74.1%
Unemployment rate	4.4%	6.1%	5.1%
% of economically inactive who want a job	35.1%	25.9%	24.1%

Source: Annual Population Survey 2016

6.98 The APS is based on local authority geographies, and does not provide data at neighbourhood level. Economic activity within the neighbourhood impact area can, however, be assessed using the 2011 Census. While six years old, the Census remains the most robust source of data at smaller geographical scales.

6.99 The neighbourhood impact area has similar levels of economic participation than seen in the local impact area and across London. The employment and unemployment rate in the neighbourhood impact area is also very similar across all geographical levels, as shown in Table 6.11.

Table 6.11: Economic Activity 2011

Indicator	Neighbourhood Impact Area	Local Impact Area	Wider Impact Area	England
Economically active residents (16 to 74)	13,403	118,397	4,384,217	27,183,134
Economic activity rate	69.0%	68.1%	71.7%	69.9%
Employed residents	11,753	103,986	3,817,203	24,143,464
Employment rate	87.7%	87.8%	87.1%	88.8%
Unemployment rate	7.3%	6.5%	7.3%	6.3%

Source: 2011 Census

6.100 Understanding how economic activity rates have changed provides important context on the changing composition of the labour force over recent years. The APS provides time series data to show how economic activity rates have changed over the past decade. In 2005/06, the economic activity rate in the local impact area – at 73.7 % – was slightly higher than the 73.2 % recorded in 2015/16, suggesting that there has been a decrease in the proportion of the local population who are economically active, whilst the wider impact area and England have seen an increase in the economic activity rate. The employment rate in the local impact area has increased – from 67.3 % to 70.0 % – at a faster rate than the national average and unemployment in the local impact area has decreased by a significant 4,200 residents, equivalent to a 4.3 %, over the 10 year period.

6.101 Camden's JSNA highlights that despite recent reductions in overall unemployment, Camden's long term unemployment (over 12 months) has increased by 129 % from 645 in April 2008 to 1,480 in June 2013. The JSNA also identifies demographic and geographic disparities in the unemployed population, with youth unemployment at 7.2 % and higher rates for women and people from Black Minority Ethnic communities. Unemployment is also high in areas of deprivation, such as St Pancras and Somers Town, Kilburn, Haverstock and King's Cross wards.

Latent Labour

6.102 The number of residents claiming Jobseekers' Allowance (JSA) also provides useful context on the number of unemployed residents across the study area, as shown in Table 6.12. This measure does not align with the analysis presented above as not all unemployed people claim JSA, and therefore are not recorded by this dataset.

6.103 The claimant count[78] suggests that, as of January 2017, there are a total of 250 residents in the neighbourhood impact area and 2,050 residents in the local impact area claiming JSA, increasing to 74,415 across the wider impact area.

6.104 In the neighbourhood and local impact areas a significant proportion of claimants are seeking sales and customer service occupations, at 62.0 % and 61.0 % respectively, which is broadly in line with the average trend across the wider impact area and England.

6.105 Within the neighbourhood impact area there is a higher than average proportion of claimants seeking employment as a process, plant and machine operative and within skilled trades occupations, whilst lower proportions of claimants are seeking administrative and secretarial occupations within the neighbourhood impact area compared to the local and wider averages.

6.106 Within the local impact area, a higher than average proportion of residents are seeking employment in higher paid managerial, professional; and technical occupations (14.6 %) relative to the comparator areas – neighbourhood impact area (10.0 %), wider impact area (10.3 %) and England (9.2 %). Lower proportions of claimants locally are seeking employment within sales and customer service, process, plant and machine operative and elementary occupations, compared to the neighbourhood and wider impact areas and England.

Table 6.12: Sought Occupation of JSA Claimants - January 2017

Occupation	Neighbourhood Impact Area		Local Impact Area	Wider Impact Area	England
Occupation unknown	5	2.0%	2.2%	3.6%	5.0%
Managers and Senior Officials	20	8.0%	9.5%	6.7%	7.1%
Professional Occupations	0	0.0%	2.0%	1.2%	0.8%
Associate Professional and Technical Occupations	5	2.0%	3.2%	2.5%	1.4%
Administrative and Secretarial Occupations	15	6.0%	7.6%	7.6%	5.7%
Skilled Trades Occupations	10	4.0%	3.2%	2.4%	2.6%
Personal Service Occupation	5	2.0%	2.2%	2.1%	1.9%
Sales and Customer Service occupations	155	62.0%	61.0%	62.9%	59.0%
Process, Plant and Machine Operatives	10	4.0%	1.2%	1.7%	2.5%
Elementary Occupations	25	10.0%	8.3%	9.3%	13.9%
Total	**250**	**100%**	**100%**	**100%**	**100%**

Source: ONS Jobseekers Allowance by Occupation 2017

[78] Office for National Statistics via Nomis, 2017. Jobseeker's Allowance by Occupation. London. Office for National Statistics.

Industry of Employment

6.107 The APS provides a breakdown of the industry of employment for residents in employment. This is summarised in Table 6.13, with data gaps representing where the sample size was zero or disclosive (i.e. there is potential for entities to be individually identified through assessment of the data and therefore cannot be shared).

6.108 The local impact area has a higher than average proportion of residents working in banking, finance and insurance industries (29.5 %), service industries (90.9 %) and transport and communications industries (14.7 %), when compared to the average for the wider impact area and particularly when compared to England.

6.109 The number of residents employed in distribution, hotels and restaurants (11.0 %), manufacturing (2.3 %), construction (5.7 %), and public administration, education and health (25.0 %) are proportionately under-represented in the local impact area, relative to the wider impact area and England averages.

Table 6.13: Industry of Employment (October 2015-September 2016)

Standard Industrial Category	Local Impact Area	Wider Impact Area	England
Agriculture and fishing	-	0.1%	1.0%
Energy and water	-	0.8%	1.5%
Manufacturing	2.3%	3.8%	9.4%
Construction	5.7%	6.9%	7.0%
Distribution, hotels and restaurants	11.0%	15.9%	18.3%
Transport and communications	14.7%	12.3%	9.4%
Banking, finance and insurance	29.5%	26.1%	17.7%
Public administration, education and health	25.0%	26.4%	29.4%
Other services	10.8%	7.2%	5.9%
Total services	90.9%	87.8%	80.6%

Source: Annual Population Survey 2016

6.110 As previously noted, the APS does not provide data at neighbourhood level; therefore analysis of resident employment by industry can be undertaken using the 2011 Census. The Census suggests that the neighbourhood impact area has even fewer residents employed in manufacturing (1.8 %), construction (3.2 %), and public administration, education and health (22.9 %) than the local impact area, demonstrating that these industries are notably underrepresented in the neighbourhood impact area. However, a notable 32.4 % of neighbourhood residents are employed within the banking, finance and insurance sectors, which is greater than the wider averages. A higher proportion of residents also work in distribution, hotels and restaurants compared to residents in the local and wider impact areas.

Qualifications and Skills

6.111 **Figure 6.2** provides an indication of the qualifications and skills profile of residents aged 16 and over in the neighbourhood, local and wider impact areas. The 2011 Census indicates that 48.7 % of residents in the neighbourhood impact area had a level 4 qualification, suggesting that more residents are qualified to degree level or higher compared to the wider impact area (37.7 %) and England (27.7 %), albeit slightly lower than the local impact area (50.5 %). Furthermore, fewer residents in the neighbourhood and local impact areas possess no qualifications, at 15.1 % and 12.7 % respectively, compared to the national level (22.5 %).

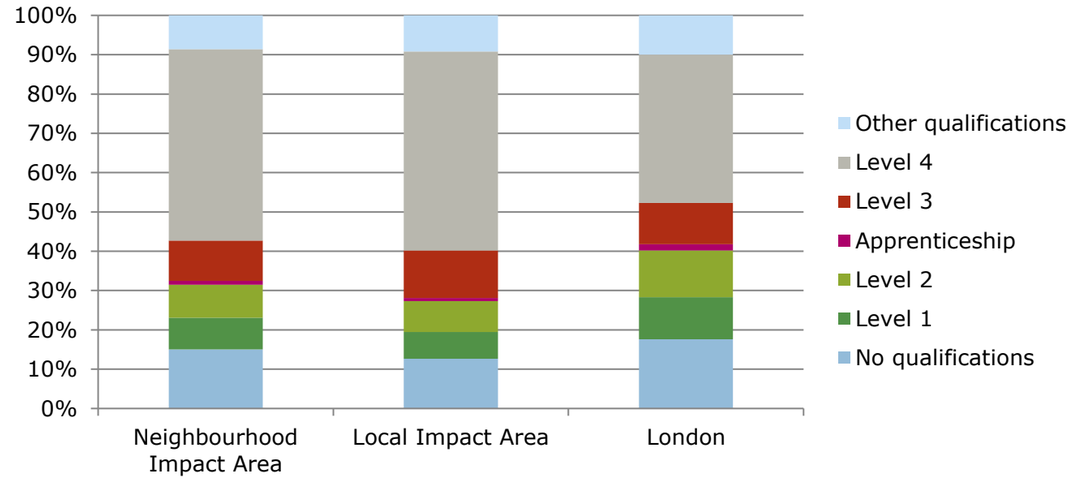

Figure 6.2: Qualification level profile[79] (Source: 2011 Census)

Deprivation

6.112 Data from the JSNA shows that compared to the other London boroughs, the local impact area is ranked the 15th most deprived in London. Deprivation levels are linked to numerous health problems (chronic illness, lower life expectancy) and unhealthy lifestyles (obesity, smoking, drugs misuse).

6.113 At a neighbourhood level, Camden Town with Primrose Hill and Haverstock rank 269 and 171, respectively out of 628[80]. This means that Camden Town with Primrose Hill is in the 4th decile for most deprived, while Haverstock is in the 2nd decile for the most deprived wards in London.

6.114 More recent evidence on deprivation was published in 2015. The 2015 Index of Multiple Deprivation (IMD)[81] is calculated based on the analysis of nine domains including; income, employment, health, education, crime, barriers to housing services, living environment and income deprivation affecting children and older people. IMD is a national index, which enables direct and consistent comparisons to be made between all areas of England through consideration of relative levels of multiple deprivation.

6.115 LBC ranks 69th out of 326 local authority areas, placing it within the 22% most deprived areas in England. As shown in Table 6.14, when broken down by domain, evidence suggests that higher levels of deprivation in the local impact area are related to general income (19.9%) and income deprivation affecting children (11.0%) and older people (8.0%), living environment (1.2%) and crime (10.4%). However the education, skills and training domain appears to be an area within limited deprivation in LBC.

Table 6.14: IMD Rank by Domain across the Local Impact Area

Domain	Rank	% most Deprived LA
Overall IMD	69 / 326	21.2%
Income	65 / 326	19.9%

[79] No qualifications; Level 1 qualification – 1+'O' level passes, 1+ CSE/GCSE any grades, NVQ level 1, or Foundation level GNVQ; Level 2 qualification – 5+'O' level passes, 5+ CSE (grade 1), 5+ GCSEs (grade A – C), School Certificate, 1+'A' levels/'AS' levels, NVQ level 2, or intermediate GNVQ; Apprenticeship; Level 3 qualification – 2+ 'A' levels, 4+ 'AS' levels, Higher School Certificate, NVQ level 3, or Advanced GNVQ; Level 4/5 qualification – first degree, higher degree, NVQ levels 4 and 5, HNC, HND, qualified teacher, medical doctor, dentist, nurse, midwife or health visitor; and Other qualification – Vocational/Work-related Qualifications, Qualifications gained outside the UK (Not stated/ level unknown).

[80] Indices of Multiple Deprivation, 2010. London Data Store for ward level data. London. Department for Communities and Local Government.

[81] Indices of Multiple Deprivation, 2010. London Data Store for ward level data. London. Department for Communities and Local Government.

Table 6.14: IMD Rank by Domain across the Local Impact Area		
Domain	**Rank**	**% most Deprived LA**
Employment	135 / 326	41.4%
Education, Skills and Training	271 / 326	83.1%
Health Deprivation and Disability	129 / 326	39.6%
Crime	34 / 326	10.4%
Barriers to Housing and Services	115 / 326	35.3%
Living Environment	4 / 326	1.2%
Income Deprivation Affecting Children Index (IDACI)	36 / 326	11.0%
Income Deprivation Affecting Older People (IDAOPI)	26 / 326	8.0%
Source: DCLG 2015		

6.116 Deprivation also varies across the local impact area, with pockets of deprivation apparent at a more localised level. The Lower Super Output Areas (LSOAs) within which the application site lies is particularly deprived, with an average IMD ranking of 2,960 out of 32,844 LSOAs in England, placing it in the top 9.0 % most deprived LSOAs nationally.

6.117 The following plan shows the location of the proposed development relative to areas of deprivation across the local impact area.

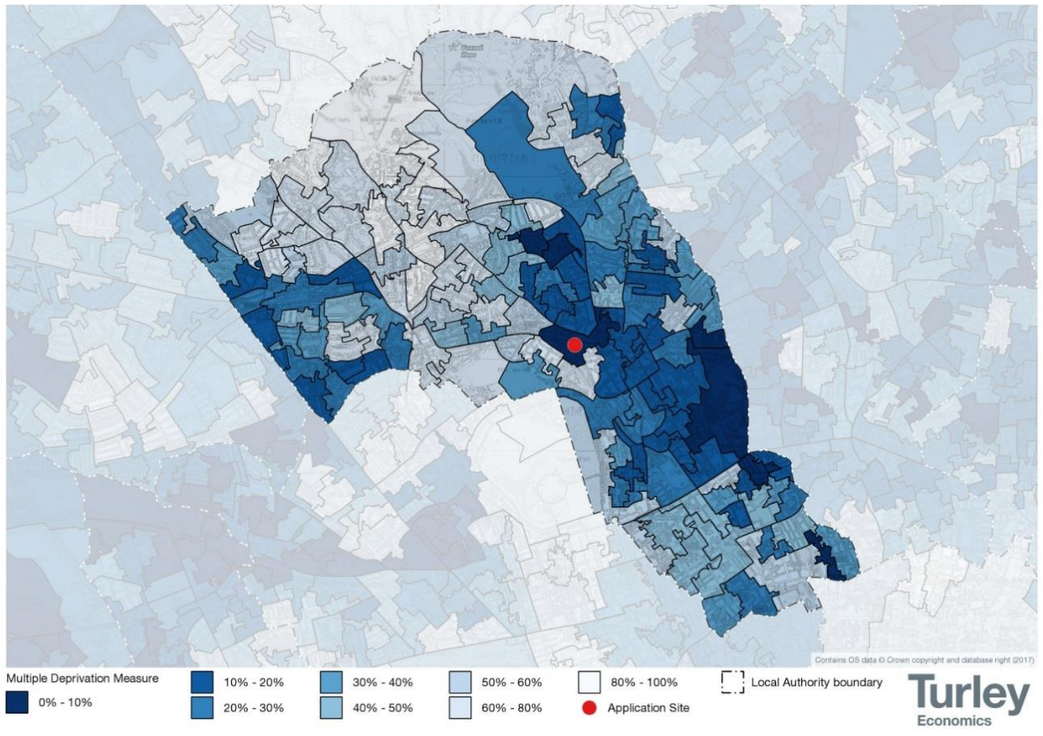

Figure 6.3: Rank of IMD across Local Impact Area

Housing

6.118 The baseline for housing is provided at the local level, reflecting the geography at which housing targets are set. The following bullet points set out key characteristics of the local impact area's current housing profile:

- LBC's existing stock of homes is made up largely of relatively small dwellings, with 37 % of all tenures having one bedroom and 33 % having two bedrooms, equating to 70 % one and two bed properties. This trend is even more dominant in the affordable housing tenure, with one and two bed social rented properties rising to 75 %;
- In 2011, a total of 11.7 % of households overall in the local impact area were overcrowded, increasing to 19.3 % for social rented households; and
- The average household size in the local impact area increased from 2.06 in 2001 to 2.18 in 2011.

6.119 LBC's latest published AMR[82], covering the period from April 2014 – March 2015, identifies the current housing provision in LBC and the future trajectory in accordance with the 2015 London Plan housing target for LBC (see Figure 6.4).

6.120 According to the AMR, there were 1,541 net dwelling completions in the 2014/15 monitoring year, which is notably higher than the annual delivery target of 889 dwellings over the period from 2015 to 2025. Despite historic and forecast fluctuations in the number of net additional dwellings delivered, the AMR states that LBC is on target to meet its long term housing supply targets, with the estimated number of completed homes exceeding the London Plan target of 889 dwellings for the plan period.

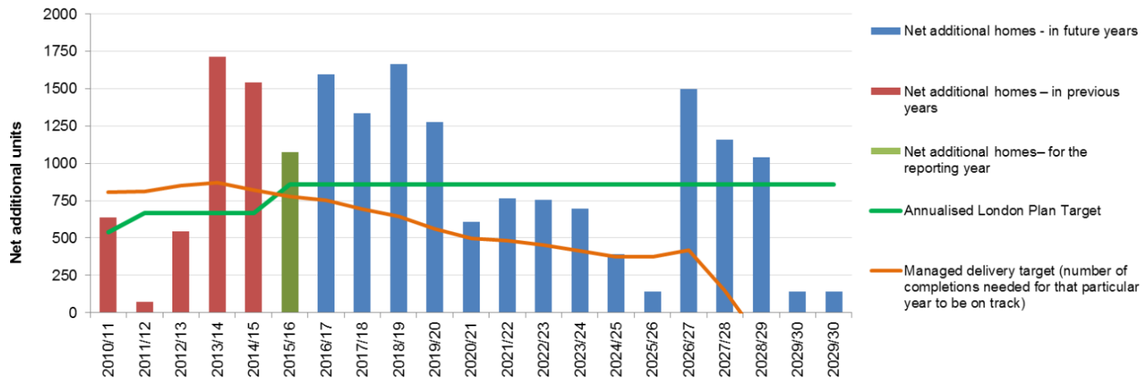

Figure 6.4: LBC Housing Trajectory (Source: LBC Authority Monitoring Report 2015)

6.121 Policy H1 of the Draft Local Plan sets out that there is a need to provide homes that meet the housing needs of existing and future residents in terms of the number, quality, type and mix of homes, in addition to the particularly large requirement for affordable homes in the local impact area. As a result, LBC seeks to deliver at least 16,800 homes in total from 2016-2031, including 11,130 additional self-contained homes, equating to 1,120 new homes per annum. Of the 16,800 homes to be delivered, the emerging Local Plan indicates that 5,565 additional homes should be affordable.

6.122 The Camden strategic housing market assessment (SHMA) sets out the types of homes that are needed going forward. The Camden SHMA indicates that within the market sector there is a greater need for two- and three-bedroom homes, followed by one-bedroom homes / studios. The greatest requirement in the affordable sector is likely to be for two and three-bedroom homes followed by homes with four bedrooms or more.

[82] London Borough of Camden, 2015. Authority Monitoring Report 2014/15. London: London Borough of Camden.

6.123 An Affordable Housing Statement accompanies the application and explores the context for affordable housing in more detail.

Local Authority Revenue

6.124 Local authorities across the country and the services they run have seen the funding they receive from Central Government cut significantly since the onset of the recession. In addition to funding cuts, local authorities are also struggling as a result of other social pressures, such as increases to the cost of living. LBC have a programme in place to save £78 million by 2017/18. This will be sufficient to balance LBC's budget by 2017/18 and to get a step ahead in closing the budget gap beyond this. Current forecasts show that LBC Council will need to make additional £20 million of budget reductions over the three years from 2018/19 to 2020/21 to meet the funding gap[83].

Council Tax

6.125 Council tax accounted for 10.8% of LBC Council's overall income in 2015/16[84]. Consequently, any new homes delivered add directly to the Council's (and so local services') funding. The Council's latest Annual Financial Report[85] indicates that, in 2015/16, approximately £116.6 million income was collected through Council Tax. Over the 10 year period to 2015/16, the income collected from Council Tax has increased by 2.3% on average per annum. This baseline data is not relevant to the neighbourhood or wider impact areas as it refers to local authority revenues.

New Homes Bonus

6.126 Since New Homes Bonus funding came in to effect in 2010, the LBC has been allocated £7.6 million over 7 years[86]. In 2017/18, approximately £1.3 million in New Homes Bonus payments was provisionally allocated to the LBC, which is higher than the average annual payment of £1.1 million over the past 7 years. This baseline data is not relevant to the neighbourhood or wider impact areas as it refers to local authority revenues.

Business Rates

6.127 The amount of business rates collected by the LBC is one of the highest in the country, therefore the total amount collected is distributed between the Government, GLA and LBC. In 2015/16 the LBC retained 17% of the business rates collected, less reliefs and deductions[87]. Retained business rates accounted for 8.3% of LBC's overall income in 2015/16[88].

6.128 LBC's latest Annual Financial Report indicates that in 2015/16, approximately £502.9 million of income was collected through business rates. Over the 10 year period to 2015/16, the income collected from business ratepayers has increased by 6.8% on average per annum.

6.129 This baseline data is not relevant to the neighbourhood or wider impact areas as it refers to local authority revenues.

Education Baseline

6.130 As previously stated, this assessment of education considers the primary schools within the primary school Planning Area 3 (PA3) (within which the application site is located) and all secondary schools within Camden. Nevertheless, consultation with a Senior Officer of the Strategy & Change, Corporate Services at LBC confirmed that:

"Primary age children from the Camden Town with Primrose Hill ward area could attend schools in this and other localities within Planning Area 3, other Primary Planning Areas within Camden and other Local Authority areas i.e. nearby Westminster. Secondary age children are more likely to travel greater distances to school and potentially cross borders i.e. nearby Westminster, there are no Planning Areas at secondary in Camden."[89]

Primary Schools

6.131 As shown in Figure 6.5, there are nine schools within PA3. These schools are listed in Table 6.15.

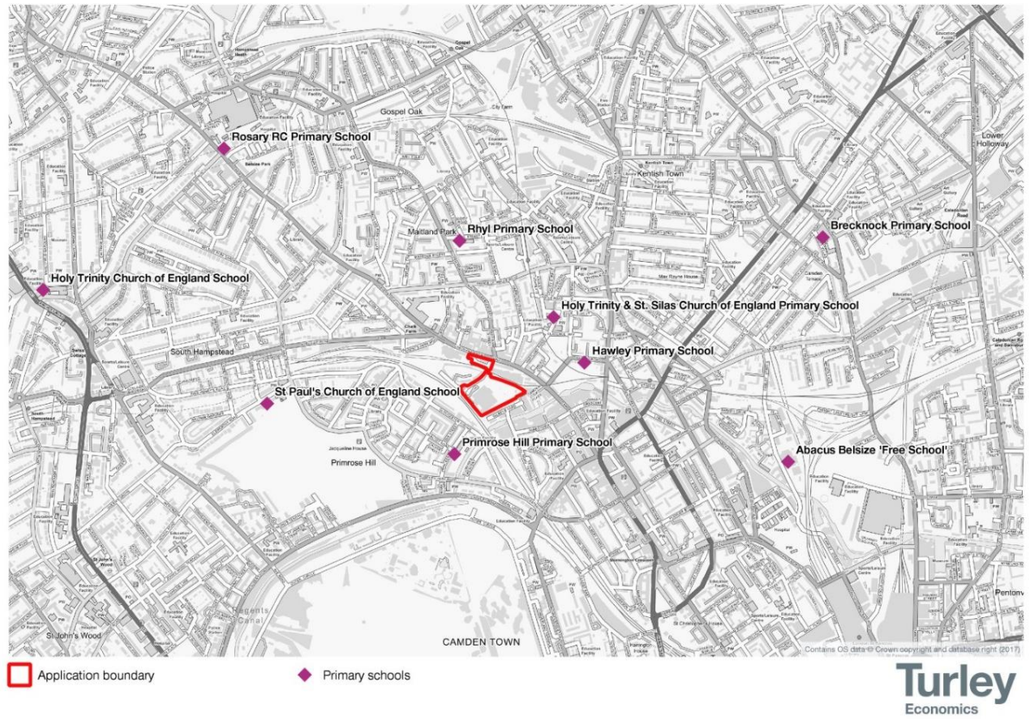

Figure 6.5: Existing Primary School Locations

Table 6.15: Current Primary School Capacity

Primary School	School Places	Pupil Roll (R – Y6)	Spare Capacity
Abacus Belsize 'Free School'	90	83	7
Brecknock Primary School	420	369	51
Hawley Primary School	87	85	2
Holy Trinity & St. Silas Church of England Primary School	210	207	3
Holy Trinity Church of England School	189	186	3
Primrose Hill Primary School	450*	443	7
Rhyl Primary School	420	388	39
Rosary Roman Catholic Primary School	315	299	16

[83] London Borough of Camden, 2016. The scale of the challenge. London. London Borough of Camden.
[84] London Borough of Camden, 2016. Final Challenge Infographic. London. London Borough of Camden.
[85] London Borough of Camden, 2016. Annual Financial Report 2015/16. London. Borough of Camden.
[86] Department of Communities and Local Government, 2016. New Homes Bonus provisional allocations 2017 to 2018. London. Department of Communities and Local Government.
[87] London Borough of Camden, 2016. Annual Financial Report 2015/16. London. LBC.
[88] London Borough of Camden, 2016. Final Challenge Infographic. London. LBC.
[89] Correspondence between Turley and Mark Griffin, Senior Officer of the Strategy & Change, Corporate Services at LBC on 13/06/2017.

Table 6.15: Current Primary School Capacity			
Primary School	**School Places**	**Pupil Roll (R – Y6)**	**Spare Capacity**
St Paul's Church of England School	210	210	0
Total Planning Area 3	**2,391**	**2,270**	**121**
* Note that Primrose Hill Primary School currently has a 1FE bulge in Year 6. Source: LBC 2016			

6.132 Primrose Hill Primary School is the closest school to the application site, located approximately 225 m to the centre of the application site. Holy Trinity and St Silas Church of England Primary School, and Hawley Primary School the second and third closest schools. These schools are operating close to capacity.

6.133 The Education Act 1996, section 444(5)[90] suggests that a distance of 3.2km for a child under eight years old can be considered to be "walking distance" for a local school. Assuming that it takes 30 minutes to walk a distance of 3.2 km, all of the local primary schools within PA3 are located within walking distance of the application site, with the exception of Holy Trinity Church of England School, which lies just beyond a 30 minute walking distance.

6.134 Evidence published within the 2016 Annual School Places Planning Report[91], presented in Table 6.15, shows that there is currently spare capacity within all schools in PA3, with the exception of St Paul's Church of England School which is currently operating at capacity. The combined spare capacity across the planning area equates to 121 places.

6.135 The 2016 Annual School Places Planning Report sets out that the pupil roll in PA3 is expected to increase in 2017/18 before declining over the period to 2025/26. School Roll Projections received in June 2016, as set out within the 2016 Annual School Places Planning Report, demonstrate that in PA3 there will be between 182 and 393 space places available within the planning area over the period from 2017/18 to 2025/26, as shown in Table 6.16.

Table 6.16: Forecast Primary School Capacity			
Forecast Year	**School Places**	**Pupil Roll**	**Spare Capacity**
2017/18	2,484	2,302	182
2018/19	2,544	2,286	258
2019/20	2,604	2,281	323
2020/21	2,604	2,256	348
2021/22	2,604	2,242	362
2022/23	2,604	2,225	379
2023/24	2,604	2,211	393
2024/25	2,604	2,212	392
2025/26	2,604	2,217	387
Source: LBC 2016			

Secondary Schools

6.136 As shown in Figure 6.6, there are 10 secondary schools in LBC with Haverstock School being the closest to the application site, located approximately 470 m to the centre of the application site. These schools are listed in Table 6.17.

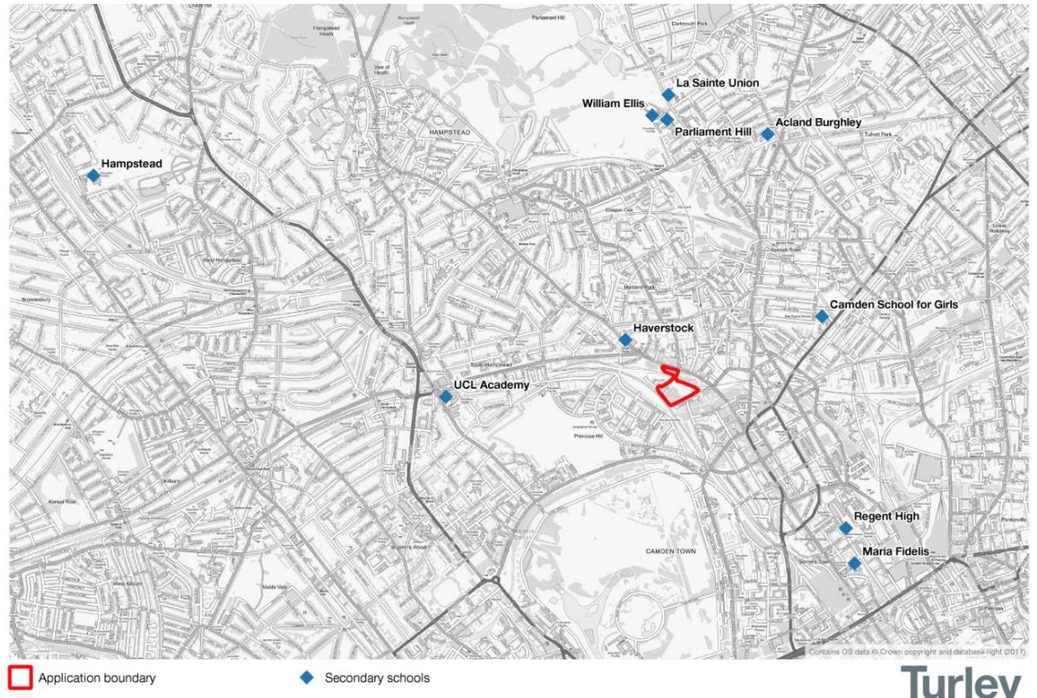

Figure 6.6: Existing Secondary School Locations

Table 6.17: Current Secondary School Capacity			
Secondary School	**Number of Places**	**Pupil Roll (Y7 – 11)**	**Spare Capacity**
Acland Burghley	910	762	148
Camden School for Girls	580	568	12
Hampstead	1050	1013	37
Haverstock	1050	1013	37
La Sainte Union	900	885	15
Maria Fidelis	750	538	212
Parliament Hill	900	884	16
Regent High	900	718	182
UCL Academy	720	698	22
William Ellis	625	611	14
Total	**8385**	**7690**	**695**
Source: LBC 2016			

[90] Education Act 1996 c. 56. 1996.Available at: http://www.legislation.gov.uk/ukpga/1996/56/contents

[91] London Borough of Camden, 2016. 2016 Annual School Places Planning Report Primary – Secondary. London: London Borough of Camden.

6.137 The Education Act 1996, section 444(5)[92] suggests that a distance of 4.8km for a child over eight years old can be considered to be "walking distance" for a local school. Assuming that it takes 45 minutes to walk a distance of 4.8 km, all of the secondary schools within LBC are located within walking distance of the application site, with the exception of Hampstead School.

6.138 Evidence published within the 2016 Annual School Places Planning Report, presented Table 6.17, shows that there is currently spare capacity within all secondary schools in the local impact area. The combined spare capacity across the planning area equates to 695 places.

6.139 Secondary schools in LBC have experienced an increasing trend of spare capacity over recent years, with the percentage of surplus places increasing from 9.2 % in 2012 to 16.7 % surplus places in 2016 without accounting for the UCL Academy, or 17.7 % surplus places including the UCL Academy.

6.140 Over future years, this trend is predicted to change and the level of surplus capacity to decline in LBC schools. By 2022/23, there is expected to be a deficit in secondary school places equivalent to 122 places, increasing to a deficit of 290 places in 2024/25, before declining slightly to 224 places in 2025/26. This is trend is shown in Table 6.18.

6.141 The 2016 Annual School Places Planning Report states that the June 2016 School Roll Projections are higher than the previous forecasts from 2014 and 2015 due to revisions of the underlying data, increasing housing development and increasing actual rolls than forecast for 2015/16. The report highlights that the shortfall in school places could range between 4FE to around 7.4FE, if the school roll does in fact filter through as the forecasts suggest.

Table 6.18: Forecast Secondary School Capacity

Forecast Year	School Places	Pupil Roll	Spare Capacity
2017/18	8,625	7,942	683
2018/19	8,693	8,089	604
2019/20	8,761	8,304	457
2020/21	8,825	8,535	290
2021/22	8,885	8,794	91
2022/23	8,885	9,007	-122
2023/24	8,885	9,154	-269
2024/25	8,885	9,175	-290
2025/26	8,885	9,109	-224

Source: LBC 2016

Health Baseline

General Health

6.142 The 2015 IMD includes a measure of deprivation based on health, deprivation and disability. The 2015 IMD health ranking for the local impact area stands at 129 out of 326. This demonstrates that the borough is within the top 39.6 % most deprived areas of the country in relation to crime.

6.143 The health rank varies dramatically across the local impact area, with the most deprived lower super output area (LSOA) in LBC being within the top 2.2 % most deprived LSOAs in England (ranking at 710 out of 32,844) and the least deprived LSOA ranking at 32,258 out of 32,844 (within the 1.8 % least deprived). The LSOA within which the application site lies maintains a health ranking of 8,245 out of 32,844 and so is within the 25.1 % most deprived LSOAs in England.

6.144 LBC's JSNA states that ill health and disability has an impact on the local impact area's working age population, with 52 % of benefits claimants claiming due to incapacity to work, which is high relative to the average for the wider impact area (42 %) and the UK (43 %). Mental and behavioural issues account for 56 % of the incapacity to work claims in the local impact area. As such, mental health is a key consideration for LBC.

6.145 The 2011 Census provides evidence on the health of all residents in the neighbourhood, local and wider impact areas, and England. The data (see Table 6.19) shows that over half of the population (51.7 %) in the neighbourhood impact area have very good levels of health; however, this is slightly less than the average across the local impact area (53.4 %). The proportion of residents identified as having bad or very bad health in the neighbourhood impact area (6.5 %) is higher than London (5.0 %) and England (5.4 %).

Table 6.19: General Health 2011

Level of General Health	Neighbourhood Impact Area	Local Impact Area	Wider Impact Area	England
Very Good Health	51.7%	53.4%	50.5%	47.2%
Good Health	30.4%	30.6%	33.3%	34.2%
Fair Health	11.5%	10.4%	11.2%	13.1%
Bad Health	4.9%	4.2%	3.7%	4.2%
Very Bad Health	1.7%	1.4%	1.2%	1.2%

Source: 2011 Census

6.146 According to the 2011 Census (see Table 6.20), 83.5 % of residents in the neighbourhood impact area are not limited in their day-to-day activities. This is slightly lower than the local impact area (85.9 %) and across London (85.8 %), but higher than the national average (82.4 %).

Table 6.20: Long-Term Health Problem or Disability 2011

Impact Area	Day-to-day activities limited a lot	Day-to-day activities limited a little	Day-to-day activities not limited
Neighbourhood Impact Area	8.1%	8.4%	83.5%
Local Impact Area	7.0%	7.4%	85.6%
Wider Impact Area	6.7%	7.4%	85.8%
England	8.3%	9.3%	82.4%

Source and Terminology: 2011 Census

6.147 The Camden JSNA provides evidence on obesity in the local impact area based on the Camden GP dataset as of September 2012 (Table 6.21). The dataset shows that among people aged 18 years and over registered with a GP in LBC, 42,709 people (21 %) were overweight and 20,442 (10 %) were obese. The JSNA recognises that child and adult obesity rates are greater in people living in the most deprived areas of the local impact area.

6.148 Further evidence from Public Health England[93], published in 2015, shows the prevalence of underweight, healthy weight, overweight, obesity and excess weight in adults across the local and wider impact areas, with England also presented for comparison. This is presented in Table 6.21, showing that a lower proportion of residents (46.5 %) in the local impact area are of excess weight, than compared to the wider impact area (58.4 %) and England (64.6 %).

[92] Education Act 1996 c. 56. 1996.Available at: http://www.legislation.gov.uk/ukpga/1996/56/contents

[93] Public Health England, 2015. Active People Survey: excess weight data for the Public Health Outcomes Framework (2013 –2015). London. Public Health England.

Table 6.21: Prevalence of Weight (2013-2015)			
Category of Weight	**Local Impact Area**	**Wider Impact Area**	**England**
% Underweight	1.9%	1.6%	1.2%
% Healthy Weight	51.6%	40.0%	34.2%
% Overweight (excluding obese)	31.2%	38.2%	40.6%
% Obese	15.2%	20.2%	24.0%
% Excess Weight (overweight combined with obese)	46.5%	58.4%	64.6%
Source: Public Health England 2015			

6.149 Nationally, rates of obesity have almost doubled in the past 25 years, increasing from approximately 13 % in 1988 to 24 % in 2013 in men and from 16 % in 1988 to 26 % in 2013 in women. Based on the extrapolation of national obesity trends, the JSNA sets out that by 2025, 47 % of males and 36 % of females in the local impact area could be obese.

Health Care Provision

6.150 As shown in Figure 6.7, there are nine GP surgeries within a 1 mile (1.6 km) walking distance of the application site. The closest is Primrose Hill Surgery, located approximately 480 m to the centre from the application site.

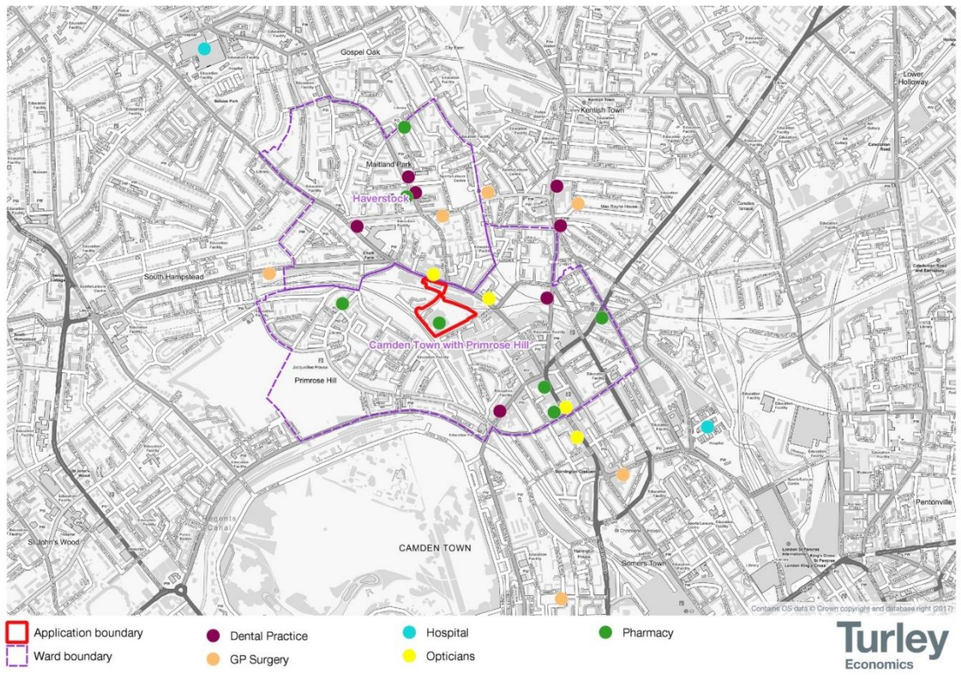

Figure 6.7: Existing Health Care Facility Locations

6.151 Information obtained from Camden and Islington Public Health (CIPH[94]), presented in Table 6.22, shows that in March 2016, seven of the nine GP surgeries were staffed by 59.2 FTE GPs with 60,944 registered patients. This equates to an average of 1,029 patients per FTE GP, which is lower than the Camden average of 1,624 patients per FTE GP[95]. The Royal Academy of General Practitioners set out a recommended target of 1 GP per 1,800 people[96]. Nevertheless, communication with CIPH established that there is no recommended ratio of patients per full-time GP due to the differing needs of the registered patients of GP surgeries. GP surgeries plan and utilise their workforce to best meet the needs of their patients.

Table 6.22: Existing GP Surgeries[97]				
GP Surgery	**No. Patients on Roll**	**Total GP's (FTE)**	**No. Patients per GP (FTE)**	**Z-Score**
Primrose Hill Surgery	6,157	-	-	-
The Matthewman Practice	1,795	1.0	1,795	0.3
Prince Of Wales Group Surgery	8,443	8.1	1,040	-0.9
Adelaide Medical Centre	11,931	9.6	1,248	-0.6
Four Trees Surgery	2,126	-	-	-
Queens Crescent Practice	3,676	4.5	819	-1.3
James Wigg Practice	20,270	24.6	826	-1.3
Ampthill Practice	8,884	7.0	1,278	-0.6
The Regents Park Practice	5,945	4.6	1,304	-0.5
Total (excluding Primrose Hill Surgery and Four Trees Surgery)	**60,944**	**59.2**	**1,029**	**-0.96**
Source: CIPH 2016				

6.152 A 'Z-score' is used by CIPH to identify the capacity situation within each GP surgery relative to the LBC average. The Z score is the number of standard deviations from the mean patient to FTE GP ratio in the LBC. A negative Z-score shows a patient to GP ratio below the LBC average i.e. fewer patients per FTE GP. Only one of the GP surgeries within a 1 mile walking distance of the proposed development maintains a Z-score above zero, and hence has a GP ratio above the Camden average i.e. a greater number of patients per FTE GP. This demonstrates that there is a higher level of capacity in GP surgeries within a 1 mile walking distance of the application site, relative to the average level of capacity across the local impact area.

6.153 Evidence from the NHS Choices website[98] indicates that there are nine dental practices within 0.5 miles (800 m straight line distance) of the proposed development as shown in Figure 6.7. As set out in Table 6.23, there are 25 dentists working at these practices, indicating capacity for around 45,000 patients. Available data suggests that two local dental practices, Albany Dental Practice and Mydentist, are currently accepting new patients.

[94] GP Patient Ratios spreadsheet emailed to Turley by Ian Sandford, Public Health Strategist at Camden and Islington Public Health on 31/03/2017. GP staff and patient roll information was sought by Turley as CIPH have access to the most up-to-date and accurate data.
[95] GP data is unavailable for Primrose Hill Surgery and Four Trees Surgery
[96] Note that this differs to the Camden ratio as GP's are not considered in FTE terms.
[97] Data gaps represent where information is unavailable.
[98] National Health Services, 2017. Choices [online website]

Table 6.23: Existing Dental Practices

Dental Practice	Approx. Distance (miles)	Dentists	Capacity of Dentists*	Accepting new patients
Parkway Dental Care	0.3	2	3,600	-
Ivy House Dental Practice	0.3	1	1,800	-
Albany Dental Practice	0.4	2	3,600	Yes
Michael Wieder's Dental Surgery	0.4	2	3,600	-
Kentish Town Dental Centre	0.4	3	5,400	-
mydentist, Kentish Town Road, Camden	0.5	5	9,000	Yes
Camden Dental Centre	0.5	4	7,200	-
Ace Dental	0.5	6	10,800	-
Haddenham Dental Centre	0.5	-	-	-
Total	**-**	**25**	**45,000**	**-**

*Note: based on 1 dentist per 1,800 residents
Sources: NHS Choices 2017, Accessed 21 April 2017

6.154 The Camden Pharmaceutical Needs Assessment (2015)[99] sets out that there are 68 pharmacies overall in Camden, of which five are located within the ward of Camden Town with Primrose Hill and two within the ward of Haverstock, totalling seven pharmacies within the neighbourhood impact area as shown in Figure 6.7.

6.155 The local impact area of Camden has the second highest rate of community pharmacies per 100,000 residents in London, at 30 pharmacies per 100,000. Although, within Camden Town with Primrose Hill, the number of pharmacies per 100,000 residents is higher than the Camden average, whilst Haverstock maintains a lower average. This is shown in Table 6.24.

Table 6.24: Existing Pharmacies

Ward	Total Population	No. of Pharmacies	Pharmacies per 100,000 Residents
Camden Town with Primrose Hill	12,910	5	39
Haverstock	12,540	2	16
Neighbourhood Impact Area	**25,450**	**7**	**28**
Local Impact Area	**226,000**	**68**	**30**

Source: Camden Health and Wellbeing Board 2015

6.156 The Camden Pharmaceutical Needs Assessment states that "*the average number of items dispensed per pharmacy in Camden is lower than most other boroughs, which may be a result of the high density of pharmacies in the borough and high day time population. The low average number of items per pharmacy suggests that current demand for essential services is being met and there would be capacity, on average, to meet any increased demand for prescriptions that might arise over the next few years*"[100].

6.157 Further information obtained from the NHS Choices website[101] identifies that:

- The nearest two hospitals are St Pancras Hospital and Royal Free Hospital. St Pancras Hospital is a specialist hospital for geriatric and psychiatric medicine and Royal Free has an Accident & Emergency Department; and
- There are four opticians within 0.5 miles (800 m) of the application site, with the closest two services being Foureyes London Ltd t/a Cross Eyes and Eye Contact located approximately 0.2 miles (320 m) away.

Open Space and Children's Playspace Baseline

6.158 The Camden Open Space, Sport and Recreation Study 2014[102] identify five broad categories of open space within the borough:

- Public amenity open space;
- Children's play space and young people's recreation space;
- Natural and semi-natural green space;
- Allotments and community gardens; and
- Outdoor sport and recreation.

6.159 LBC manages 68 parks and open spaces across the borough, some of which are historically important former burial ground, manors, private gardens and London squares. Beyond Council managed space, there are a total of 293 open space sites, which comprise some 588.8 ha of land within the local impact area (see Table 6.25).

6.160 The most recent survey of open spaces[103] provides details of open spaces within the two wards of Camden Town with Primrose Hill and Haverstock. There is a total of 38.5 ha within the neighbourhood impact area.

Table 6.25: Open Spaces in Neighbourhood Impact Area

Ward	*Total Area of public parks (Ha)	Total Public Open Space (Ha)	Population 2011	Public Park area per 1,000 population (Ha)	Total Public Open Space Area per 1,000 population (Ha)
Camden Town with Primrose Hill	34.2	36.1	12,613	2.7	2.9
Haverstock	1.9	2.4	12,364	0.2	0.2
Total	**36.1**	**38.5**	**24,977**	**2.9**	**3.1**

*Total park space includes the sum of the following for each ward: Linear Park / Open Space, Metropolitan Parks, District Parks, Local Parks, Small Local Parks / Open Spaces and Pocket Parks.
Source: Atkins 2014

6.161 A more detailed assessment of the types of open spaces is available within Appendix A of the Open Space, Sport and Recreation Study, which sets out that 66 % of open space in the neighbourhood impact area is District Park and the Regents Canal accounts for 16.3 % of open space. Small parks and pocket parks account for 11.7 % of open space in the area in total, as shown in Table 6.26.

[99] Camden Health and Wellbeing Board, 2015. Pharmaceutical Needs Assessment 2015 Final Report. London: London Borough of Camden
[100] Ibid - Page 8
[101] National Health Services, 2017. Choices [online website]
[102] Atkins, 2014. Camden's Open Space, Sport and Recreation Study. London. LBC.
[103] Ibid

Table 6.26: Existing Open Spaces in Neighbourhood Impact Area

	Name	Size (ha)	% of Total Provision	Primary function
Camden Town with Primrose Hill	Camden Gardens	0.2	0.5%	Pocket Park
	Chalcot Square	0.2	0.5%	Pocket Park
	Clarence Way Games Pitch	0.1	03%	Outdoor sports facilities / playing fields (private)
	Clarence Way Open Space	0.2	0.5%	Pocket Park
	Hawley Street Open Space	1.3	3.4%	Small local park/open space
	Primrose Hill Open Space	25.3	65.5%	District Park
	Regent's Canal	6.3	16.3%	Linear open space / green corridors
	Regents Park Terrace	0.1	0.3%	Amenity green space
	St Martin's Garden	0.7	1.8%	Small local park/open space
	Barrow Hill Reservoir	1.6	4.1%	Other
	St Georges Terrace	0.1	0.3%	Amenity green space
Haverstock	Maitland Park Enclosure	0*	0.0%	Amenity green space
	Talacre Public Open Space	1.9	4.9%	Small local park/open space
	Adelaide Road Private Nature Reserve	0.5	1.3%	Natural or semi-natural urban greenspaces
	Beckington Open Space	0.1	0.3%	Amenity green space
	Total	**38.6**	**100%**	**-**

*It is assumed that this number is smaller than 0.1
Source: Atkins 2014

6.162 When considering Children's playspace individually within the neighbourhood impact area, the Camden Open Space, Sport and Recreation Study 2014[104] identifies the following provision within the two wards of Camden Town with Primrose Hill and Haverstock:

- Camden Town with Primrose Hill – 1,300 m2 of formal play provision and 221,576 m2 of informal play provision
- Haverstock - 400 m^2 of formal play provision and 11,353 m^2 of informal play provision

6.163 This equates to 114.9 m^2 of play space per child in Camden Town with Primrose Hill and a significantly lower 4.9 m^2 of play space per child in Haverstock. Based on this information, the current provision of play space per child in the neighbourhood impact area equates to 54.0 m^2 which is somewhat higher than the LBC average of 26.5 m^2 of play space per child.

Crime Baseline

6.164 The DAS provides information on the current context for crime within and around the application site:

"The site is near a high concentration of Bars, Pubs, Clubs and Music Venues associated with Camden Towns thriving night time economy. The site is bordered with railway lines and the backs of buildings to the south and north. The existing nature of the site and its isolated situation leave it prone to antisocial behaviour and crime. Antisocial behaviour at night, in particular, impacts neighbouring residents with activity spilling over from the night time economy in the town centre.

Characteristics that contribute to this issue are:

- *Limited access onto the site with ill defined routes and poor connections.*
- *Poorly defined boundaries*
- *Large surface car park and lack of activity after store closes*
- *Lack of active frontages and passive surveillance*
- *Dead end situations*
- *Drug dealing and taking is reported on the site*
- *There is a high level of drink related crime in the area*
- *Urination on the streets at the end of the night is a particular issue that affects much of the surrounding residential streets.*
- *Sheer numbers of people at the end of a night making their way home."*

6.165 The 2015 IMD includes a measure of deprivation based on crime. The 2015 IMD crime ranking for the local impact area stands at 34 out of 326. This demonstrates that the borough is within the top 10.4% most deprived areas of the country in relation to crime.

6.166 The crime rank varies dramatically across the local impact area, with the most deprived lower super output area (LSOA) in LBC being within the top 0.2 % most deprived LSOAs in England (ranking at 63 out of 32,844) and the least deprived LSOA ranking at 27,006 out of 32,844 (within the 20 % least deprived). The most deprived LSOA in LBC with a ranking of 63 out of 32,844 is the LSOA within which the application site lies.

6.167 The latest available data from the Home Office[105] suggests that in March 2017 a total of 3,739 various crimes were recorded in LBC of which 345 took place within the neighbourhood impact area. These crimes are presented by type in Table 6.27. The table shows that a higher proportion of crimes in the neighbourhood impact area are related to drugs, theft from the person and violence and sexual offences, relative to the local average.

Table 6.27: Crimes in March 2017

Type of Crime	Neighbourhood Impact Area		Local Impact Area	
	No. of times reported	% of Crimes	No. of times reported	% of Crimes
Anti-social behaviour	80	23%	847	23%
Bicycle theft	5	1%	96	3%
Burglary	17	5%	201	5%
Criminal damage and arson	11	3%	146	4%
Drugs	26	8%	110	3%
Other crime	0	0%	16	0%
Other theft	33	10%	594	16%
Possession of weapons	1	0%	12	0%
Public order	10	3%	157	4%

[104] Atkins, 2014. Camden's Open Space, Sport and Recreation Study. London: London Borough of Camden.

[105] Home Office, 2017. ASB Incidents, Crime and Outcomes. London. Home Office.

Table 6.27: Crimes in March 2017

Type of Crime	Neighbourhood Impact Area		Local Impact Area	
	No. of times reported	% of Crimes	No. of times reported	% of Crimes
Robbery	5	1%	123	3%
Shoplifting	8	2%	165	4%
Theft from the person	57	17%	432	12%
Vehicle crime	25	7%	266	7%
Violence and sexual offences	67	19%	574	15%
Total	**345**	**100%**	**3,739**	**100%**

Source: Home Office 2017

6.168 Evidence from the Home Office suggests that the level of crime in the neighbourhood and local impact areas is decreasing. Data suggests that the number of crimes in March 2017 relative to March 2011 were 17.8 % lower in the local impact area and 14.0 % lower in the neighbourhood impact area. Crime data across the wider impact area is not considered here as it is not relevant at this scale (London-wide).

Sensitive Receptors

Existing Sensitive Receptors

6.169 The baseline section confirms the following receptors that may be affected by the proposed development, all of which are considered to have a sensitivity of medium or higher:

- Existing residents – High sensitivity;
- Existing employees – High sensitivity;
- Existing economy – High sensitivity;
- Existing businesses – High sensitivity;
- Existing health and education services and facilities – High sensitivity; and
- The local authority of LBC –High sensitivity.

New Sensitive Receptors

6.170 Future sensitive receptors introduced to the application site by the proposed development would include the new residents and employees living and working at the proposed development and new businesses operating on the application site. These receptors are all considered to be of high sensitivity.

6.171 The new residents would place demand on community facilities, which are also considered to be of high sensitivity.

Potential Impacts and Likely Effects

6.172 This section of the chapter assesses the potential impacts and likely effects of the proposed development, during the demolition and construction stage and once the development is completed, taking into consideration embedded mitigation in the development proposals.

6.173 The proposed development is expected to be built out over a six year period and over three phases. This assessment considers the overall construction impacts associated with the total construction activity (including all phases) and the impacts associated with the fully completed development.

Demolition and Construction

6.174 The temporary direct and indirect employment, apprenticeship and GVA effects estimated to be generated by the proposed development on the neighbourhood, local and wider impact areas during the demolition and construction stage are summarised in the following sections.

Construction Management

6.175 This chapter assumes that the proposed development will support construction apprenticeships during the demolition and construction stage, reflecting the fact that "*The Council will require the recruitment of 1 apprentice per £3million of built costs, through the Kings Cross Construction Skills Centre, as well as a number of work experience placements*", as stated within the EIA Scoping Opinion[106]. This can be secured through discussions with LBC and an appropriately worded condition in the event that planning permission is granted.

Employment

6.176 As previously noted, the application site is currently occupied by an existing Morrisons supermarket (MS) and petrol filling station (PFS). Based on evidence provided by the Applicant, the existing uses currently support 58 full time jobs and 153 part time jobs, equating to approximately 161 FTE jobs. During the demolition and construction stage of the proposed development, the 161 FTE jobs currently supported on-site would be temporarily relocated to other stores and the proposed temporary store. It is assumed that the other stores would be located elsewhere within Greater London and hence would not be lost from the wider impact area.

6.177 Based on evidence provided by the Applicant, the proposed temporary store is expected to support approximately 120 employee jobs. Assuming that the full time and part time split of employees would reflect the existing store, the temporary facility would support 43 full time jobs and 77 part time jobs, equating to approximately 81 FTE jobs.

6.178 Based on the methodology set out within the Method of Assessment section of this chapter, the demolition and construction stage investment in the proposed development has the capacity to directly support approximately 131 gross FTE jobs during the construction period (see Table 6.28).

6.179 When considering the displacement of the existing 161 gross FTE jobs currently supported within the existing Morrisons supermarket and PFS from the application site (yet retained within the wider impact area), the provision of 81 gross FTE jobs on-site within the temporary store and the generation of 131 FTE temporary construction jobs on-site on average, the proposed development would have the potential to support on average 51 FTE direct net additional jobs on-site annually during the demolition and construction stage. This is demonstrated in Table 6.28.

Table 6.28: Demolition and Construction Stage Direct On-Site Employment Generation

Employment Generation	Gross Direct Employment (FTE) On-Site
Existing Employment (Morrisons and PFS)	161
Proposed Employment (Temporary Store)	81
Proposed Employment (Demolition and Construction Works)	131
Total Gross Direct Net Additional Employment On-Site	51

* Note that figures may not sum due to rounding
Source: Turley 2017

6.180 It must be noted that this is a high level assessment of the likely change in on-site employment. The level of employment supported on-site during the construction period would fluctuate from the 53 FTE

[106] London Borough of Camden, 2016. EIA Scoping Opinion for Morrison's Supermarket and Petrol Filling Station, Camden, NW1 8AA (Ref 2016/6418/P) dated 23rd December 2016. London. LBC.

jobs as a result of the timescales for the occupation of the temporary store and the volume of construction employees on-site would vary depending on phasing and development requirements.

6.181 The beneficial economic effects of the demolition and construction stage of the proposed development would extend beyond direct construction employment to include the generation of indirect and induced benefits. For instance, investment would result in considerable expenditure on construction materials, goods and other services that would be purchased from a wide range of suppliers. The result is that the initial investment in the proposed development would be amplified by economic 'multiplier' effects linked to expenditure on goods and services locally. This would bring indirect employment and financial benefits for local individuals and firms involved in construction trades and associated professions.

6.182 When assessing the employment impacts across the various scales and taking account of additionality factors, the demolition and construction stage of the proposed development could support an average of 185 net additional FTE jobs per annum across the wider impact area over the six year build period, including six net additional FTE jobs within the local impact area. Due to the small geography of the neighbourhood impact area, it has been assumed that no construction jobs would be taken by residents of the neighbourhood impact area. As a result, there would be a net loss of approximately four FTE jobs within the neighbourhood impact area.

Table 6.29: Demolition and Construction Stage Net Additional Employment Generation

Employment Generation	Neighbourhood Impact Area	Local Impact Area	Wider Impact Area
FTE Employment	51	51	51
Direct Net Additional Employment (FTE)	-4	5	123
Indirect / Induced Net Additional Employment (FTE)	0	1	62
Total Net Additional Employment (FTE)	-4	6	185
Source: Turley 2017			

6.183 The ONS claimant count statistics[107] demonstrate that there is latent demand for construction employment within the neighbourhood, local and wider labour force. In total, there are approximately five economically active unemployed working age residents within the neighbourhood impact area seeking employment within the construction sector, increasing to 45 residents at the local scale and 1,415 residents across London. These residents could form a potential source of construction labour for the proposed development. As noted above it is not considered robust to assume that any residents of the neighbourhood impact area would be employed in the scheme due to the small geography this covers.

6.184 The impact of construction related employment at the scale of the local and wider impact areas would be beneficial, due to the potential for employment generation and wealth creation. The magnitude of the impact would be very low at the neighbourhood scale[108], very low at the scale of the local impact area and low at the wider scale when benchmarked against the historic change in construction employment across the various scales. The sensitivity of the receptor (existing residents) is considered to be high due to the policy importance of jobs provision. Therefore, there is likely to be a direct and indirect, temporary, medium term, **Minor Beneficial** effect at the wider level and **Negligible** at the local scale. The effect at the neighbourhood scale would also be **Negligible**, based on the assumption that no construction jobs would be taken by residents of the neighbourhood impact area.

Construction Apprentices

6.185 Construction companies are familiar with apprenticeships as a form of workforce development and consider apprenticeships to be jobs with training as opposed to training places. Generally, upon completion of an apprenticeship, an apprentice will become a trained employee within the same company. Many construction companies are familiar with the requirement to provide apprenticeships and work experience placements as part of construction contracts.

6.186 The EIA Scoping Opinion[109] received from LBC stated that "*The Council will require the recruitment of 1 apprentice per £3million of built costs, through the Kings Cross Construction Skills Centre, as well as a number of work experience placements.*" On this basis, and reflecting the estimated cost of the proposed development, the proposed development has the potential to support 43 construction apprenticeships during the construction period[110].

6.187 The King's Cross Construction Skills Centre is recognised to offer a variety of Level 1 and Level 2 training courses available free to unemployed local residents. There is social benefit associated with gaining a formal qualification through an apprenticeship scheme due to the annual increase in productivity and earnings from having NVQ Level 2 qualifications. According to the Department for Education (DfE)[111], men with Level 2 apprenticeships as their highest qualification have a lifetime productivity premium of around £139,000 compared to those qualified to level 1 or 2, while the premium for women is around £67,000[112]. DfE also evidence that of all people who complete an apprenticeship, 82% are male and 18% are female.

6.188 Based on the evidence above, the value of skills and training associated with Level 2 construction apprenticeships equates to £3,156 per apprentice per annum, when considering the average weighting for men and women and assuming an average working 'lifetime' of 40 years. Assuming that all 43 construction apprenticeships would be provided at Level 2, the proposed development could generate £5.5 million in lifetime social and economic value.

6.189 The impact of construction apprentices on the economy and population is assessed as beneficial. The magnitude of the impact of the proposed development on apprenticeship starts across the local impact area would be very high, relative to the insignificant number of construction apprenticeship starts (approximately 30 apprenticeships[113]) in LBC over recent years, and low at the wider scale relative to the greater number of apprenticeship starts and increase in the number of construction apprentices over recent years[114]. The sensitivity of the receptor (existing residents) is considered to be high due to the policy importance of jobs provision. Therefore, there is likely to be a direct, medium term, temporary, **Major Beneficial** effect on the economy and population across the local impact area, and a **Minor Beneficial** effect at the wider scale.

Economic Productivity

6.190 The existing Morrisons supermarket and PFS uses on-site currently generate economic value. Based on the application of the relevant productivity value (GVA per FTE) to the number of direct, indirect and induced FTE jobs currently supported, it is estimated that the productivity impact of the current on-site activities equates to approximately £13.2 million GVA within the wider economy each year, of which approximately £2.9 million per annum is expected to accrue to the local economy and £650,000 within the neighbourhood impact area. Due to the temporary relocation of the existing employees to other stores and the proposed temporary store, some of this GVA will be lost from the application site and the

[107] Office for National Statistics via Nomis, 2017. Jobseeker's Allowance by Occupation. London. Office for National Statistics.
[108] 'Very low' comprises the lowest level of magnitude, however it should be noted that the magnitude of the impact will be considerably small and almost nil.
[109] London Borough of Camden, 2016. EIA Scoping Opinion for Morrison's Supermarket and Petrol Filling Station, Camden, NW1 8AA (Ref 2016/6418/P) dated 23rd December 2016. London. London Borough of Camden.
[110] Estimated construction cost divided by £3 million equals 44 construction apprentices.
[111] Department for Education, 2014. The economic value of key intermediate qualifications: estimating the returns and lifetime productivity gains to GCSEs, A levels and apprenticeships. London. Department for Education.
[112] Department for Education, 2014. The economic value of key intermediate qualifications: estimating the returns and lifetime productivity gains to GCSEs, A levels and apprenticeships Research report. London. Department for Education.
[113] Department for Education, March 2017. FE data library: Apprenticeships geography data tool: starts 2011/12 to 2016/17 reported to date. London. Department for Education.
[114] Apprenticeship data is not available for the neighbourhood impact area and so the impact cannot be assessed at this scale.

neighbourhood and local impact areas. Based on the assumption that the other stores will be located elsewhere within Greater London, existing GVA will not be lost from the wider impact area.

6.191 The proposed temporary store is expected to generate £6.7 million GVA within the wider economy each year, including £1.5 million per annum within the local economy and £330,000 within the neighbourhood economy.

6.192 The proposed development's contribution to annual economic productivity in the local economy– measured in GVA – is estimated to be approximately £3.1 million each year during the demolition and construction stage. The impact rises to approximately £12.8 million GVA when assessed at the wider impact area level. No productivity is expected to be generated within the neighbourhood impact area during the demolition and construction stage due to the overall displacement of jobs on the application site.

6.193 When considering the displacement of the existing GVA generated on-site (yet retained within the wider impact area) against the generation of GVA within the temporary store and the GVA associated with the demolition and construction of the proposed development, the scheme would result in the generation of circa £19.5 million net additional GVA per annum within the wider economy during the demolition and construction stage, inclusive of £1.7 million within the local economy. It is assumed that there would be a net loss of approximately £320,000 to the neighbourhood economy each year during the demolition and construction stage. While GVA would be generated within the neighbourhood impact area this would be less than that currently generated by the application site at present. The data is summarised in Table 6.30.

Table 6.30: Demolition and Construction Stage Productivity Generation

Net GVA Generation	Neighbourhood Impact Area	Local Impact Area	Wider Impact Area
Existing GVA (Morrisons and PFS)			
Direct GVA Impact	£580,000	£2,200,000	£8,700,000
Indirect / Induced GVA Impact	£70,000	£700,000	£4,500,000
Total Net Additional GVA Impact (Annual)	£650,000	£2,900,000	£13,200,000
Proposed GVA (Temporary Store)			
Direct GVA Impact	£290,000	£1,100,000	£4,400,000
Indirect / Induced GVA Impact	£40,000	£350,000	£2,300,000
Total Net Additional GVA Impact (Annual)	£330,000	£1,500,000	£6,700,000
Proposed GVA (Demolition and Construction Works)			
Direct GVA Impact	£0	£2,700,000	£9,900,000
Indirect / Induced GVA Impact	£0	£470,000	£2,900,000
Total Net Additional GVA Impact (Annual)	£0	£3,100,000	£12,800,000
Total Net Additional GVA			
Direct GVA Impact	**-£290,000**	**£1,600,000**	**£14,300,000**
Indirect / Induced GVA Impact	**-£40,000**	**£120,000**	**£5,200,000**
Total Net Additional GVA Impact (Annual)	**-£320,000**	**£1,700,000**	**£19,500,000**

Source: Turley 2017

6.194 The impact on the economy of increases in construction related GVA uplift would be beneficial, with wealth creation in the neighbourhood and wider impact areas. The magnitude of the impact would be very low at the neighbourhood scale, medium at the scale of the local impact area and low at the scale of the wider impact area, when benchmarked against the historic change in construction GVA. The sensitivity of the receptor (existing economy) is considered to be high given the policy priority placed on economic growth. Therefore, there is likely to be a direct and indirect, temporary, medium term, **Minor Beneficial** effect at the local and wider scales and **Negligible** at the neighbourhood scale.

Expenditure

6.195 It is estimated that the on-site employees would generate additional spending power locally. This analysis has been included on request of LBC as set out in the Scoping Opinion.

6.196 Based on a high level and indicative assumption that 50 % of the 131 direct gross on-site construction employees spend £5 each working day on retail goods, the proposed development could generate £80,000 expenditure each year during the demolition and construction stage, in turn supporting local shops and services. The on-site employee expenditure impacts are subsumed within the assessment of employment and productivity impacts during the demolition and construction stage, provided previously in this section of the chapter and therefore the two figures should not be summed.

6.197 The impact of changes in expenditure on local businesses would be beneficial. The magnitude of the impact of the proposed development on expenditure levels across the neighbourhood impact area would be low and very low across the local and wider impact areas. The effect would therefore be temporary, medium term, **Minor Beneficial** at the neighbourhood level and **Negligible** at the local and wider scales.

Completed Development

6.198 The proposed development is expected to generate a range of potential significant direct and indirect social and economic impacts, with likely permanent effects. Due to the proposed phasing of the proposed development, the social and economic impacts of the completed development would start to be realised while construction is ongoing. However for the purposes of this assessment, the completed development's impacts as a whole, have been considered.

6.199 This section of the socio-economic chapter assesses the net additional impacts of the proposed development by taking to account the displacement of existing uses and the resulting socio-economic effects generated, including employment, productivity and business rates.

Proposed Development

6.200 This chapter does not rely upon any embedded mitigation within the assessment of socio-economic impacts during the completed development stage.

6.201 The assessment of the residential impacts of the completed development is based on the proposed housing mix presented in Table 6.31.

Table 6.31: Proposed Development Housing Mix

Unit Type	Unit Tenure			Total
	Market units	Affordable Rented	Intermediate Rented	
Studio	62	0	0	**62**
1 bed	140	23	46	**209**
2 bed	146	29	36	**211**
3 bed	41	42	0	**83**
4+ bed	0	8	0	**8**
Total	**389**	**102**	**82**	**573**

Source: Turley 2017

6.202 The population yield and child yield expected to be generated as a result of the proposed housing mix are detailed in Table 6.32.

Table 6.32: Proposed Development Population and Child Yield by House Type

Unit Type	No. of units	Average Household Size	Child Yield per Tenure	Population (All Ages)	Children (Aged 0-18)	Primary Children (Aged 5-11)	Secondary Children (Aged 12-16)
Market Units							
1 bed	202	2.0	0.04	396	8	3	2
2 bed	146	2.0	0.14	286	20	8	6
3 bed	41	2.0	0.37	80	15	6	4
4 bed	0	2.0	1.55	0	0	0	0
5 bed	0	2.0	1.55	0	0	0	0
Affordable Rented							
1 bed	23	2.0	0.10	45	2	1	1
2 bed	29	2.0	1.24	57	36	14	10
3 bed	42	2.0	1.53	82	64	25	18
4 bed	8	2.0	2.60	16	21	8	6
5 bed	0	2.0	2.60	0	0	0	0
Intermediate Rented							
1 bed	46	2.0	0.10	90	5	2	1
2 bed	36	2.0	1.24	71	45	17	12
3 bed	0	2.0	1.53	0	0	0	0
4 bed	0	2.0	2.60	0	0	0	0
5 bed	0	2.0	2.60	0	0	0	0
Total	**573**	**-**	**-**	**1,124**	**216**	**84**	**60**

Sources:
2011 Census - Persons per bedroom
Camden Survey of New Housing (2002-08) child yields

Employment

6.203 This section first assesses the economic impacts associated with the current operation of the existing uses at the application site, before detailing the anticipated net additional economic effects of the proposed development during the completed development stage.

6.204 As previously noted, the application site is currently occupied by an existing Morrisons supermarket and PFS. Based on evidence provided by the Applicant, the existing uses currently support 58 full time jobs and 153 part time jobs, equating to approximately 161 FTE jobs. Once completed and operational, the proposed Morrisons supermarket and PFS is expected to support the same number of jobs as currently supported on-site.

6.205 Once completed and fully operational, the proposed development is expected to support 1,184 direct gross FTE jobs on-site, based on the methodology set out within the Method of Assessment section of this chapter. The proposed gross FTE jobs are broken down by type in Table 6.33.

Table 6.33: Proposed Development Employment Generation by Use

Proposed Use	Direct Gross FTE Jobs
Residential facilities	11
Retail	129
Office	869
Workspace	14
Morrisons	161
Total	**1,184**

Source: Turley 2017

6.206 Of the gross FTE jobs expected to be supported on-site, 161 FTE jobs are currently supported and as a result are not additional to the economy. Therefore the net additional gross number of FTE jobs supported on-site equates to 1,024.

6.207 In order to calculate net FTE jobs generated by the proposed development, considerations of appropriate allowances for leakage and displacement are made in line with recognised guidance[115] as detailed in the methodology section of this chapter. Taking this in to consideration, it is estimated that 1,044 direct, indirect and induced FTE jobs could be net additional to the wider impact area, including 218 net additional FTE jobs in the local impact area, of which 51 could be supported in the neighbourhood impact area, as set out in Table 6.34.

Table 6.34: Completed Development Stage Employment Generation[116]

Employment Generation	Neighbourhood Impact Area	Local Impact Area	Wider Impact Area
Existing Gross Direct Employment On Site (FTE)	161	161	161
Proposed Gross Direct Employment On Site (FTE)	1,184	1,184	1,184
Net Gross Employment (FTE) (proposed less existing)	1,024	1,024	1,024
Leakage	973	819	154
Displacement	5	31	174
Direct Net Additional Employment (FTE)	46	174	696
Indirect / Induced Net Additional Employment (FTE)	5	44	348
Total Net Additional Employment (FTE)	51	218	1,044

Source: Turley 2017

6.208 The impact on the population of increases in employment across the neighbourhood, local and wider impact areas would be beneficial, due to the potential for employment generation and wealth creation during the completed development stage. The creation of additional FTE jobs as a result of the completed development would also assist LBC and the GLA in achieving their strategic objectives to support economic growth.

[115] Homes and Communities Agency, 2014. Additionality Guide 4th Edition. London. Homes and Communities Agency.

[116] Figures may not sum due to rounding.

6.209 The magnitude of the impact would be medium at the scale of the neighbourhood and local impact areas and very low at the wider scale, when benchmarked against historic employment rates across the various scales. The sensitivity of the receptor (existing and future residents) is considered to be high due to the policy importance of jobs provision. Therefore, there is likely to be a direct and indirect, permanent, long term, **Minor Beneficial** effect at the neighbourhood and local levels and a **Negligible** effect at the wider scale.

Economic Productivity

6.210 As previously noted, it is estimated that the productivity impact of the current on-site activities equates to approximately £13.2 million GVA within the wider economy each year, of which approximately £2.9 million per annum is expected to accrue to the local economy and £700,000 within the neighbourhood impact area. It is expected that this level of GVA would also be generated by the proposed Morrisons supermarket and PFS.

6.211 Once completed and fully operational, the proposed development is expected to generate a total of £94.9 million GVA within the wider economy, £20.6 million within the local economy and £4.6 million within the neighbourhood economy.

6.212 The uplift in annual productivity in the neighbourhood economy as an impact of the completed development – measured in GVA – is estimated to be approximately £4.0 million per annum. The impact rises to approximately £17.7 million GVA when assessed at the local impact area level, and to £81.6 million GVA at the wider level. This is summarised in Table 6.35.

Table 6.35: Completed Development Stage Productivity Generation

Net GVA Generation	Neighbourhood Impact Area	Local Impact Area	Wider Impact Area
Existing direct, indirect and induced GVA Impact	£700,000	£2,900,000	£13,200,000
Proposed direct, indirect and induced GVA Impact	£4,600,000	£20,600,000	£94,900,000
Total Net Additional GVA Impact (Annual)	£4,000,000	£17,700,000	£81,600,000

Source: Turley 2017

6.213 The impact on the economy of increases in operational related GVA uplift would be beneficial, with wealth creation in the neighbourhood, local and wider impact areas. The magnitude of the impact would be low at the scale of the neighbourhood and local impact areas and very low at the wider scale when benchmarked against the historic change in GVA across the various scales. The sensitivity of the receptor is considered to be high given the policy priority placed on economic growth. Therefore, there is likely to be a direct and indirect, permanent, long term, **Minor Beneficial** effect at the neighbourhood and local scales and a **Negligible** effect at the wider scale.

Population, Labour Force and Skills

6.214 The proposed development has the potential to provide accommodation for a range of households, the majority of which would contain economically active residents. Economically active people are a valuable resource in terms of the labour force that is available to local employers, as well as a potential source of competitive advantage in attracting new business investment. This aligns with priorities of the London Plan and the emerging Camden Local Plan local to ensure support the economy and employment growth.

6.215 The assessment indicates that the delivery of 573 dwellings could increase the resident population by approximately 1,124 residents upon completion and occupation of new homes as shown in Table 6.32. As part of the population analysis the GLA Population Yield Calculator was used for comparison, which estimates that the proposed development would generate approximately 1,200 residents. Therefore this assessment is considered to estimate the worst case scenario in terms of population, labour force and skills.

6.216 Based on prevalent economic activity rates across the local impact area, the proposed development could accommodate approximately 611 economically active residents of working age. Of this total, based on employment rates in the local impact area, approximately 582 residents on the application site could be in employment.

6.217 Given that employed residents of the proposed development maintain a comparable skills profile to that of the local impact area, the proposed development has the potential to improve the local labour force profile. Approximately 432 residents are expected to be employed in managerial, director, professional and technical roles, with approximately 294 residents likely to obtain Level 4 qualifications.

6.218 The effect of increasing the economically active population and skills within the local labour force is assessed as beneficial. The magnitude of the impact of the proposed development on the overall level of economic activity across the neighbourhood impact area would be very high, across the local impact area would be high and very low at the wider scale, relative to the change in economically active population. The sensitivity of the receptor is considered to be high reflecting on levels of economically active population growth. The effect would therefore be permanent, long term and **Major Beneficial** at the neighbourhood level, **Moderate Beneficial** at the local level and **Negligible** at the wider scale.

Business Space and Activity

6.219 As discussed in the Baseline section of this chapter, there is currently a shortage of and increasing demand for affordable and readily useable workspace in the local impact area which is limiting the growth of SMEs.

6.220 A total of 87.8 % of businesses in the local impact areas are 'micro' businesses employing 0 – 9 people, showing the dominance of SME's within LBC and the importance of meeting their requirements for small business spaces. In particular, current evidence suggests that good quality business space located close to public transport connections, and within close proximity to public amenities is in high demand.

6.221 The proposed development responds to the demand for affordable, innovative and entrepreneurial working environments and supports LBC's aim to provide a diverse range of business premises in a sustainable and desirable location.

6.222 The provision of new workspace units, affordable workspace and office floorspace within Blocks A, B and F and the PFS Block and retail units as part of the proposed development would support local businesses.

6.223 As set out in Table 6.33, the workspace units could provide approximately 14 gross direct FTE employment opportunities for local people, with a further 869 FTE jobs expected to be supported by the office units and 129 FTE jobs by the proposed retail units, which could provide opportunities for local people. The business floorspace could also generate direct and indirect economic productivity within the local economy and generate an uplift in businesses rate revenue. These impacts are subsumed and quantified within the assessment of employment, productivity and business rate impacts during the completed development stage provided in this section of the chapter.

6.224 A variety of different business types and sectors of a range of sizes can be supported within the proposed development. This will help to support LBC's growth sectors (creative industries; professional, technical and business administration; science and tech) and Camden's growth sector businesses, of which 99 % are SMEs'[117]. The main users of the proposed workspaces are expected to be businesses involved in London's thriving creative economy, although such workspaces are also recognised to bring together professionals working in diverse sectors such as biotech, business services and the charity sector[118]. As noted in the baseline section, all good quality and accessible clusters of office floorspace have high occupancy rates. The credentials of the proposed business space to be provided would reflect the key

[117] London Borough of Camden, 2016. Public Examination of Camden's Local Plan - Inspector's Post Hearing Note to the Council 2nd November 2016. London. LBC.

[118] Institute for Public Policy Research, 2016. Start Me Up The Value Of Workspaces for Small Businesses, Entrepreneurs and Artists In London. London: Institute for Public Policy Research

requirements of occupiers, including quality and proximity to transport, and so is expected to attract a wide range of occupiers.

6.225 New business space and occupiers would also enhance the local business ecosystem in Camden Town and LBC more widely. There are a number of benefits associated with clustering of similar businesses, referred to as an agglomeration economy. This clustering effect is recognised to drive economic success within towns and cities due to the ability to share resources, facilities and infrastructure. It has been recognised that increased competition can also lead to innovation. LBC is increasingly recognised for its contribution to the creative economy, through the creation of the *Knowledge Quarter,* and the bio-tech sector, following the construction of the Francis Crick Institute. New business space in LBC creates an opportunity for firms to support these clusters and enhance the agglomeration effects created by like-minded businesses.

6.226 The need to support a concentration and mix of commercial uses within a local area is reflected in London and LBC policy documents.

6.227 As a result, the proposed development is likely to have a direct, permanent, long term and **Minor Beneficial** effect at the neighbourhood and local levels and a **Negligible** impact at the wider scale.

Housing Provision

6.228 The proposed development would deliver 573 new homes over the construction period, equating to an average of 96 dwellings per annum. This is equivalent to 8.5 % of the emerging Local Plan annual target of 1,120 dwellings per year. Of this residential floorspace, approximately 35 % would be affordable dwellings, further helping to both alleviate affordability issues and house those who can't afford market housing. The proposed unit mix is provided in Table 6.31.

6.229 The majority of market homes would be 2 bed properties, responding to the demand for this unit type as noted in the Baseline. The majority of affordable homes to be delivered comprise 1 and 2 bed units however, 54 % of the Affordable Rented floorspace would be 3 and 4 bedroom homes, which aligns with the requirements set out in the Development Plan, emerging policy and other material considerations.

6.230 It is expected that it would result in a direct, permanent, long term **Minor Beneficial** effect in the local impact area.

Income and Expenditure

6.231 It is estimated that new residents of the proposed development that are in employment could have gross earnings potential of at least £21.3 million per annum based on earnings data provided by ASHE[119]. Earnings fund purchases in relation to housing, food shopping, comparison goods, leisure and other forms of discretionary expenditure. This can help to support local businesses and associated employment.

6.232 Based on approximate spending trends in the local impact area, the proposed development has the potential to generate circa £14.0 million in convenience and comparison retail expenditure per annum through residents living on the scheme, with a further circa £8.9 million potentially being spent per year on leisure goods and services. This would provide a valuable source of trade for local businesses and would help to sustain employment in the local retail and leisure industries.

6.233 Further evidence published by the Home Builders Federation (HBF[120]) estimates that households spend an average of £5,000 on furnishing and decorating supplies to 'make a house feel like a home' when they move. Therefore, the residents of the proposed development also have the potential to generate one off expenditure of circa £2.9 million on home furnishings upon first occupation. This level of expenditure is considered to be a conservative estimate when reflecting on further evidence relating to a Barratt development in Middlesbrough, included within the HBF report, which indicates new homes generate higher levels of average 'first occupation' expenditure.

6.234 In addition to the uplift in expenditure associated with residents of the proposed development, the proposed development would also generate additional spending power as a result of the on-site employees during the completed development stage. Based on a high level and indicative assumption that 50 % of the 998 on-site employees spend £5 each working day on retail goods, the proposed development could generate £590,000 expenditure annually, in turn supporting local shops and services. The on-site employee expenditure impacts are subsumed within the assessment of employment and productivity impacts during the completed development stage provided previously in this section of the chapter.

6.235 The impact of changes in household and operational employee expenditure on local businesses is assessed as beneficial. The magnitude of the impact of the proposed development on expenditure levels across the neighbourhood impact area would be very high, high across the local impact area and very low at the wider scale. The effect would therefore be permanent, long term and **Major Beneficial** at the neighbourhood level, **Moderate Beneficial** at the local level and **Negligible** at the wider scale.

Local Authority Revenue

6.236 New development can make an important contribution to the resource base of local authorities, through ongoing enhancement of Business Rate and Council Tax revenues, and one off payments as a result of the New Homes Bonus. In the current economic and fiscal climate, this additional funding can be an important resource for local authorities to reinvest in local community infrastructure and services.

Council Tax

6.237 Based on the estimated mix and tenure of new homes (Table 6.31) to be developed and their estimated Council Tax banding, the proposed development is expected to generate an additional £890,000 in additional Council Tax payments annually to LBC once fully occupied[121].

6.238 Contributing to increased Council Tax revenue would be beneficial. Reflecting on the proportionately notable increase in council revenue as a result of the proposed development against the fact that a significant proportion would be offset by need to provide increased services, the impact is assessed to be of medium magnitude. Based on recent large scale cuts to local authority funding the sensitivity of the receptor is considered to be very high. Therefore, the proposed development is expected to have a permanent, long term, **Moderate Beneficial** effect at the local level.

New Homes Bonus

6.239 The NHB was introduced in 2010 by the Government as an incentive-based financial tool to encourage the delivery of new homes by providing additional funds to local authorities for every new home built. Recent reforms to the NHB system came in to effect in December 2016, which reduces payments for councils which fall below a housing growth baseline of 0.4 % and reduces payments from six years to five years in 2017-18, and to four years from 2018-19. The reforms also state that the Government will consider withholding payments to councils that fail to meet planning targets from 2018/19.

6.240 The proposed development would contribute towards securing the overall baseline level of housing growth above which NHB payments would accrue to LBC. The baseline section of this chapter identified the additional revenue historically generated through NHB in LBC, and the proposed development can be expected to generate a beneficial effect in maintaining LBC's eligibility for such payments.

6.241 The application of the assumed Council Tax bands within the Government's NHB Calculator[122] demonstrates that the proposed development could result in approximately £2.3 million NHB payments

[119] Office for National Statistics via Nomis, 2016. Annual Survey of Hours and Earnings. London: Office for National Statistics.
[120] Home Builders Federation, March 2015. The Economic Footprint of UK House Building. London: Home Builders Federation.
[121] Note: 2017/18 rate for LBC increased by 2% per annum to reflect likely cost inflation to 2018/19.
[122] Department for Communities and Local Government, 2016. New Homes Bonus calculator 2017 to 2018. London. Department for Communities and Local Government.

being made to LBC over the four years from the completion of the proposed development's residential elements.

6.242 Contributing to increased new homes bonus payments would be a beneficial impact. Due to the proportionate increase in new homes revenue expected to be generated by the proposed development relative to the revenue received by LBC to date, the impact is assessed to be of high magnitude. Based on recent large scale cuts to local authority funding the sensitivity of the receptor is considered to be very high. Therefore, the proposed development is expected to have a temporary, short term, **Major Beneficial** effect at the local level.

Business Rates

6.243 The existing Morrisons and PFS uses on-site currently generate approximately £1.1 million in business rate revenue. Once completed and fully operational, the proposed development is expected to generate a total of £3.4 million in business rates, therefore generating a net uplift of approximately £2.3 million in business rate revenue per annum for LBC.

6.244 Notably, the Government has announced that from 2020 local authorities will retain 100 % of their business rates[123]. Further consultation on the Government's commitment to allow local government to retain 100 % of the business rates they raise locally was undertaken over the period from 15 February to 3 May 2017. The feedback from the consultation is currently being analysed.

6.245 Assuming that the commitment is enforced over future years, there is potential for £2.3 million in business rate revenue to be retained by LBC per annum from 2020 onwards, as a result of the proposed development.

6.246 Contributing to increased business rate revenue is beneficial. Reflecting on the proportionate increase in council revenue as a result of the proposed development and the potential for 100 % of revenue to be retained by LBC from 2020, the impact is assessed to be of medium magnitude. Based on recent large scale cuts to local authority funding the sensitivity of the receptor is considered to be **very high**. Therefore, the proposed development is expected to have a permanent, long term, **Moderate Beneficial** effect at the local level.

Education

6.247 According to the Camden Survey of New Housing (2002-08) child yield methodology[124], the proposed development of 573 dwellings is expected to accommodate 216 children aged 0 – 18 years. This information has been used to estimate the number of primary and secondary aged children expected to reside on the application site, which equates to 84 primary school pupils and 60 secondary school pupils. It is possible that a proportion of children would already be attending schools within the impact area prior to moving to the proposed development. This therefore presents the worst case position. Regardless of this, households moving to the proposed development would free up housing elsewhere which would also generate demand and therefore these figures are the most appropriate to use.

Primary School

6.248 Reflecting on the capacity of primary schools identified in the baseline, currently there are 121 surplus places within primary schools in the neighbourhood impact area, with the level of spare capacity set to increase to 387 primary places by 2025/26.

6.249 Consultation with a Senior Officer of the Strategy & Change, Corporate Services at LBC confirmed this position:

"Primary pupil rolls (reception to year 6) in Planning Area 3 (PA3) are forecasted to decrease to 2025/26, with between 182 to 393 of potential surplus places available. Forecasted numbers at reception in PA3 indicate a low in 2018/19 recovering in later years to the end of the planning period, there could be between 27 to 47 surplus places available in any given year from 2017/18 to 2025/26. Overall at Primary across the borough, with existing planned provision, we anticipate sufficient capacity to address a potential shortfall in South at the end of the planning period to 2025/26."[125]

6.250 Based on the requirement for 84 additional pupils (which should be absorbed according to forecasts), the impact is assessed to be of very low magnitude when considered in the context of the forecast school places. The sensitivity of the receptor (education facilities) is considered to be high. Therefore the proposed development would result in a **Negligible** effect at the **neighbourhood level**.

Secondary School

6.251 Reflecting on the capacity of secondary schools identified in the baseline, currently there are 695 surplus places within secondary schools in the neighbourhood impact area. Nevertheless, evidence suggests that there is anticipated future secondary education need with a deficit in capacity equivalent to 224 places forecast for 2025/26.

6.252 Consultation with a Senior Officer of the Strategy & Change, Corporate Services at LBC provided more detail on this position:

"Secondary pressure is higher than shown in previous years, there is a consistent message when we expect utilise 2FE of (already) built additional provision in the south of the borough, potentially in 2019/20. However, forecasts show a potential shortfall of between 0.3FE to 3.4FE from 2019/20 (in any year) to the end of the reporting period, falling to within capacity from 2025/26 (with a small potential surplus of 0.5FE). Camden anticipates providing these places through bulge classes initially, and plans are under review given Academy/free school provision changes in surrounding boroughs' which could alleviate pressure within Camden."[126]

6.253 Based on the information above and the requirement for 60 additional pupils, the impact is assessed to be of medium magnitude when considered in the context of the forecast school places. The sensitivity of the receptor is considered to be high. Therefore the proposed development would result in a **Minor Adverse**, direct, permanent and long-term effect at the neighbourhood level, although LBC confirm that this is dependent on the actual future pupils numbers reflecting the forecast figures and timescales for the development of new free schools/academies.

Health[127]

6.254 Based on the Camden average FTE GP to patient ratio (1 GP per 1,624 people), it is calculated that the expected households from the proposed development would result in the need for 0.7 FTE GPs.

6.255 The evidence set out in the baseline indicates that there is sufficient GP capacity within a 1.6 km walking distance of the proposed development to accommodate new patients residing on the application site.

6.256 Given that two dental practices are accepting new patients and the neighbourhood impact area maintains a number of pharmacies to 100,000 people broadly in line with the local average, which is greater than the wider average, it is reasonable to assume that the increased population can be accommodated within existing local health facilities.

6.257 Engagement has been undertaken with CIPH in relation to whether existing facilities in the neighbourhood area would be able to accommodate an enhanced level of service, or increased number of GPs, and hence whether it is necessary to facilitate an increase in the built health facilities. Discussions to date have indicated that the existing built health facilities have sufficient capacity to accommodate the proposed development.

[123] A system of top ups, transfers and tariffs will continue to operate to help even out inequalities between the level of business rates generated by individual Local Authorities. Therefore some authorities may not retain 100%.
[124] Correspondence between Turley and Gavin Sexton, Principal Planner at LBC on 11/05/2017 confirmed that LBC's education department relies on the Camden Survey of New Housing (2002-08) child yields for estimating the number of children expected to reside on new developments.
[125] Correspondence between Turley and Mark Griffin, Senior Officer of the Strategy & Change, Corporate Services at LBC on 13/06/2017.
[126] Correspondence between Turley and Mark Griffin, Senior Officer of the Strategy & Change, Corporate Services at LBC on 13/06/2017.
[127] A Health Impact Assessment has been submitted with the application in response to the Scoping Opinion. This provides analysis across a wider range of health and wellbeing factors.

6.258 On the basis of the information set out above, the proposed development is likely to have a **Negligible** effect on health facilities at the neighbourhood level.

Open Space and Recreation Facilities

6.259 In order to secure new and enhanced open space within the local impact area and ensure that development does not put unacceptable pressure on the LBC's existing open spaces, Policy A2 Open Space of the LBC Local Plan Submission Draft[128] sets out the LBC's requirement for the provision of 9 m^2 per occupant for residential schemes and 0.74 m^2 for commercial and higher education developments.

6.260 On this basis, residents of the proposed development would generate demand for approximately 10,118 – 10,800 m^2 of open space and employees of the proposed development would generate demand for 876 m^2, as demonstrated in Table 6.36.

Table 6.36: Proposed Development Open Space Demand

Type of Development	Open Space Standard (m^2 per occupant)	No. Occupants from Proposed Development	Open Space Requirement
Residential	9.00	1,124 - 1,200* residents*	10,118 – 10,800
Commercial	0.74	1,184 employees (gross direct)	876

* The higher population estimate calculated using the GLA Population Yield Calculator assesses the worst case scenario.
Source: LBC 2016; Turley 2017

6.261 Until the LBC Local Plan Submission Draft is adopted, the open space guidance set out in Camden Planning Guidance 6 - Amenity[129] remains the current adopted guidance. As previously stated, this indicates that the amount of open space provision should be 9 m^2 per occupier in a residential development, and does not refer to provision for commercial developments.

6.262 The proposed development would provide approximately 12,261 m^2 of [MW1]open space of a range of types on-site (Table 6.37), which exceeds the demand of 10,118 – 10,800 m^2 of open space expected to be generated based on LBC's minimum open space requirement. The majority of the open space to be provided would be publically accessible and some areas would be for communal use by residents of the proposed development. The proposed development would also provide smaller private areas of open space.

6.263 Furthermore, as part of the HIA accompanying the application, the Applicant has been exploring specific interventions to ensure that public spaces are accessible to all and encourage social interaction within the community. Mental health is a key concern for LBC and therefore they are seeking opportunities to reduce isolation in the community. The landscaping and public realm plans for Camden Goods Yard are designed encourage residents and the local community to socialise through more formal interventions such as play areas, community gardens, allotments and an urban farm. Other spaces are designed to facilitate more spontaneous interactions such as street furniture, urban plazas and a communal roof garden.

Table 6.37: Proposed Open Space by Type

Type	Quantity Proposed (m^2)
Amenity Open Space	7,257
Green Amenity Open Space	3,434
Allotments/Community Gardens	368
Children's Play Space	1,129
Outdoor Sports Facilities	108
Total	**12,261**

Source: Turley 2017

6.264 The proposed development would also provide community space in the form of community growing space, which is expected to comprise an urban farm. The urban farm is envisaged as a place for workers, tourists and residents to escape the hustle and bustle and relax in the UK's largest rooftop urban farm. The farm would include events space, a bar/café, glasshouses for growing chilies and outdoor growing areas. The urban farm would provide a community offer, which at this stage is anticipated to include the following activities:

- A programme of events throughout the year.
- Relaxation and socialising areas, including roof top bar and café.
- A community garden integrated around/in the commercial growing area for local residents to grow their own produce.
- Programmed talks and tours for local schools to visit the urban farm and learn about the health and environmental benefits from urban agriculture.
- 'Pick Your Own' days, when the public are allowed access to the commercial farm and to pick chillies to take home.
- Training volunteers to in plant care, in return for harvesting assistance.
- Internships to local 16-25 year olds on Something & Son's 'Grow Yourself' programme, which encourages careers in food production and promotes urban agriculture. In similar projects such as FARM:shop, which have almost entirely sourced employees from existing or previous volunteers. An apprenticeship scheme in conjunction with the Kentish Town City Farm would be considered after the first annual cycle is complete.
- Partnerships with adult learning programmes to provide work experience, training and employment opportunities.
- Partnerships with London's growing network of city farms to collaborate on events and open days.
- Public and private intimate events to encourage community involvement in local projects across the borough.
- Food festivals promoting local food producers and consumers.

6.265 The provision of new open space and recreation facilities is likely to have an impact of low magnitude. The sensitivity of the receptor is considered to be high. It is therefore expected that the proposed development would have a Minor Beneficial direct, permanent and long-term effect on open space and recreation facilities at the **neighbourhood** level.

Children's Play Space

6.266 The GLA's Play and Informal Recreation SPG[130] sets out requirements for new development to ensure that a minimum of 10 m^2 of play space per child residing in the new development is provided within a maximum walking distance of 100 m for under 5s, 400 m for 5-11 year olds and 800 m for 12+ years. The more recent open space guidance set out in Camden Planning Guidance 6 - Amenity[131] sets out a requirement for 9 m^2 of open space per child, including 2.5 m^2 of children's play space. This assessment adopts the higher playspace requirements set out by the GLA in order to assess the worst case scenario.

[128] London Borough of Camden, 2016. Camden Local Plan Submission Draft 2016. London. LBC.
[129] London Borough of Camden, 2016. Camden Planning Guidance 6 - Amenity. London. LBC.
[130] Greater London Authority, 2012. Play and Informal Recreation Supplementary Planning Guidance. London. GLA.
[131] London Borough of Camden, 2016. Camden Planning Guidance 6 - Amenity. London: London Borough of Camden.

6.267 Table 6.38 sets out the child yield from the proposed development and the playspace requirements outlined in the GLA's SPG on Play and Informal Recreation. This calculates that demand of 2,163 m² of playspace is generated by the proposed development.

Table 6.38: Proposed Development Playspace Demand

Type of Development	Playspace Standard (m^2 per child)	No. Children from Proposed Development	Playspace Requirement (m^2)
Residential	10	216*	2,163

*Based on Camden Survey of New Housing (2002-08) child yield methodology
Source: GLA 2012; Turley 2017

6.268 Table 4.3 of the GLA's Play and Informal Recreation SPG[132] sets out that the playspace includes the following types of playspace:

- equipped play areas;
- public spaces with potential for informal play;
- kickabout areas;
- adventure playgrounds;
- skate park, bike park or other wheeled facility;
- open sport or recreation space (e.g. ball court or multiuse games area);
- fitness trails;
- outdoor stage; and
- youth shelters.

6.269 Based on this evidence, this assessment considers that amenity open space, green amenity open space, children's play space and outdoor sports facilities would contribute towards the provision of children's play space. On this basis, the proposed development would deliver 11,893 m^2 of playspace on-site, including 1,129 m^2 formal playspace, therefore exceeding the GLA's requirements.

6.270 The impact of the proposed development on children's playspace is assessed as beneficial. The magnitude of the impact of the proposed development would be low. The sensitivity of the receptor is considered to be high. Therefore, there is likely to be a direct, permanent, long-term and **Minor Beneficial** effect on the provision of children's playspace at the **neighbourhood level**.

Crime

6.271 The latest benchmark on crime incidents suggest that over 40,000 crimes were recorded in the local impact area over the past 12 months. However, if the level of crime in LBC continues to decline at the same rate as evidence shows over the past six years - from 2011 to 2017 - the additional crime incidents have the potential to be reduced.

6.272 The provision of additional housing in Camden Town is supported given that increased levels of footfall, activity and surveillance would help to address crime and safety issues.

6.273 The DAS states that meetings were held on the 24 May 2017 and 06 June 2017 with PC Adam Lindsay, a MET Designing Out Crime Officer (DCO), to discuss the proposed development in the context of Secured by Design. In response to these discussions, the proposed development has been designed to promote a safer place through the following design principles:

- The mix and disposition of uses across the application site have been carefully considered to promote activity but avoid conflict.
- A strong network of streets with areas of new public realm that are overlooked and improved visibility in to and from the application site.
- Opened up narrow passages to form wider routes with active frontages.
- Gated routes through Linear Park would be closed and locked at night.
- Restricted opportunities for external entry in to communal areas.
- Active facades on all faces and minimised backs of buildings.
- Commercial uses on lower floors to increase passing surveillance.
- All streets and spaces would be well lit and CCTV would be employed at the proposed development.
- A pop up toilet would be located adjacent to the Stables entrance on Stephenson Street to tackle the issue of street urination associated with the night time economy of Camden Town.

6.274 The impact of the proposed development on current levels of crime and disorder is therefore assessed as beneficial, due to the increase in local activity resulting in the reduced potential for additional crime. The magnitude of the impact of the proposed development would be low. Therefore, there is likely to be indirect, permanent, long-term and **Minor Beneficial** effects on crime and disorder levels at the neighbourhood level. These effects would also influence borough level crime statistics and therefore the effects at the local level would be **Minor Beneficial**.

Mitigation and Residual Effects

6.275 As part of the Applicant's commitment to ensure an appropriate development response, the Applicant is willing to commit to the preparation of a Local Employment Framework for the demolition and construction stage, which would ensure that local take up of new employment opportunities is maximised where possible. Such a framework would secure the implementation of local employment initiatives and may include commitments such as, recruiting local residents into employment positions where possible, local advertisement of opportunities, provide apprenticeships and work experience placements and use supply chains to create and promote local opportunities and local businesses. Consideration may also be given to the potential for a similar framework for the completed development stage, if feasible.

6.276 The following sections specify how any significant adverse effects would be mitigated through the use of either management control mitigation, financial contributions or physical mitigation. The mitigation measures identified below are additional to the Local Employment Framework enhancement measure noted above.

Demolition and Construction

6.277 There are no significant adverse socio-economic effects identified that require mitigation during the demolition and construction stage. The likely effects of the proposed development considering the Applicant's commitment to source workforce from the local community cannot be estimated as it is dependent on the commitments agreed. Therefore, the likely effects identified in the section above would remain unchanged for the proposed development's residual effects, as follows:

- Employment – temporary **Minor Beneficial** effect at the local and wider levels and **Negligible** at the neighbourhood level
- Construction apprenticeships – temporary **Major Beneficial** effect at the local level and **Minor Beneficial** at the wider level. Construction apprenticeships cannot be assessed at the neighbourhood scale due to the unavailability of data at this level.
- Economic productivity– temporary **Minor Beneficial** effect at the local and wider levels and **Negligible** at the neighbourhood level
- Expenditure– temporary **Minor Beneficial** effect at the neighbourhood level and **Negligible** at the local and wider levels

[132] Greater London Authority, 2012. Play and Informal Recreation Supplementary Planning Guidance. London. GLA.

Completed Development

6.278 There are no significant adverse socio-economic effects associated with the completed development, and hence no mitigation is required. Therefore, the likely effects identified in the section above would remain unchanged for the proposed development's residual effects, as follows:

- Employment – permanent **Minor Beneficial** effect at the neighbourhood and local levels and **negligible** at the wider level
- Economic productivity – permanent **Minor Beneficial** effect at the neighbourhood and local levels and **Negligible** at the wider level
- Labour provision and skills - permanent **Major Beneficial** effect at the neighbourhood level, **Moderate** Beneficial at the local level and **Negligible** at the wider level
- Business space and activity– permanent **Minor Beneficial** effect at the local level
- Housing provision – permanent **Minor Beneficial** effect at the local level
- Income and expenditure - permanent **Major Beneficial** effect at the neighbourhood level, **Moderate** Beneficial at the local level and **Negligible** at the wider level
- Council Tax – permanent **Moderate Beneficial** effect at the local level
- New Homes Bonus – temporary **Major Beneficial** effect at the local level
- Business rates – permanent **Moderate Beneficial** effect at the local level
- Primary schools –effect of **Negligible** significance at the neighbourhood level. This effect is not a significant adverse effect in EIA terms and so does not require mitigation. Nevertheless, it is expected that the Applicant will be required to pay CIL contributions that will contribute towards the provision and improvement of schools and other education facilities.
- Secondary schools – permanent **Minor Adverse** effect at the neighbourhood level. This effect is not a significant adverse effect in EIA terms and so does not require mitigation. Nevertheless, it is expected that the Applicant will be required to pay CIL contributions that will contribute towards the provision and improvement of schools and other education facilities.
- Health facilities–effect of **Negligible** significance at the neighbourhood level. This effect is not a significant adverse effect in EIA terms and so does not require mitigation. Nevertheless, it is expected that the Applicant will be required to pay CIL contributions that will contribute towards the provision and improvement of health facilities.
- Open space– **permanent minor beneficial** effect at the neighbourhood level
- Play space - **permanent minor beneficial** effect at the neighbourhood level.

Summary of Mitigation and Residual Effects

6.279 Table 6.39 and Table 6.40 provide a tabulated summary of the outcomes of the Socio-Economic Impact Assessment of the proposed development.

Table 6.39: Summary of Proposed Mitigation and Enhancement Measures

Potential Impacts and Likely Effects	Proposed Mitigation / Enhancement Measures
Demolition and Construction	
Generation of construction employment	No mitigation required. Enhancement measures include the potential for the implementation of a Local Employment Framework.
Generation of construction apprenticeships	No mitigation required. Enhancement measures include the potential for the implementation of a Local Employment Framework.
Generate construction productivity	No mitigation required. Enhancement measures include the potential for the implementation of a Local Employment Framework.
Completed Development	
Increase employment opportunities	No mitigation required. Enhancement measures include the potential for the implementation of a Local Employment Framework.
Generate operational productivity	No mitigation required. Enhancement measures include the potential for the implementation of a Local Employment Framework.
Enhance local labour provision and skills	No mitigation required. Enhancement measures include the potential for the implementation of a Local Employment Framework.
Increase local business space and support business activity	No mitigation required. Enhancement measures include the potential for the implementation of a Local Employment Framework.
Increase demand for primary education facilities	No mitigation required although financial contribution may be secured via CIL.
Increase demand for secondary education facilities	No mitigation required although financial contribution may be secured via CIL.
Increase demand for health facilities	No mitigation required although financial contribution may be secured via CIL.
Increase demand for children's playspace	No mitigation required.

Table 6.40: Summary of Residual Effects

Receptor	Description of Residual Effect	Nature of Residual Effect*					
		Significance**	+ -	D I	P T	R IR	St Mt Lt
Demolition and Construction							
Existing working age residents	Support construction employment	Negligible (neighbourhood level) Minor (local and wider levels)	+	D/I	T	R	Mt
Existing working age residents	Support construction apprenticeships	Major (local level) Minor (wider level)	+	D	T	R	Mt
Existing economy	Generate construction productivity	Minor (local and wider levels)	+	D/I	T	R	Mt
Existing businesses	Generate expenditure	Minor (neighbourhood level)	+	I	T	IR	Mt

Table 6.40: Summary of Residual Effects

Receptor	Description of Residual Effect	Nature of Residual Effect*					
		Significance**	+ -	D I	P T	R IR	St Mt Lt
		Negligible (local and wider levels)					
Completed Development							
Existing and future working age residents	Increase employment opportunities	Minor (neighbourhood and local levels) Negligible (wider level)	+	D/I	P	R	Lt
Existing and future working age residents	Generate operational productivity	Minor (neighbourhood and local levels) Negligible (wider level)	+	D/I	P	R	Lt
Existing and future working age residents	Enhance local labour provision and skills	Major (neighbourhood level) Moderate beneficial (local level) Negligible (wider level)	+	I	P	R	Lt
Existing and future businesses	Increase local business space and support business activity	Minor (local level)	+	D	P	R	Lt
Existing and future residents	Provide new housing, including affordable	Minor (local level)	+	D	P	R	Lt
Existing and future businesses	Generate income and expenditure	Major (neighbourhood level) Moderate (local level) Negligible (wider level)	+	I	P	IR	Lt
Local Authority	Generate Council Tax revenue	Moderate (local level)	+	D	P	IR	Lt
Local Authority	Generate New Homes Bonus payments	Major (local level)	+	D	T	IR	St
Local Authority	Generate business rate revenue	Moderate (local level)	+	D	P	IR	Lt
Local education facilities	Increase demand for primary education facilities	Negligible (neighbourhood level)	N/A	N/A	N/A	N/A	N/A
Local education facilities	Increase demand for secondary education facilities	Minor (neighbourhood level)	-	D	P	R	Lt
Local health facilities	Increase demand for health education facilities	Negligible (neighbourhood level)	N/A	N/A	N/A	N/A	N/A
Existing and future residents and employees	Increase demand for open space and recreation facilities	Minor (neighbourhood level)	+	D	P	R	Lt
Existing and future residents	Increase demand for children's playspace	Minor (neighbourhood level)	+	D	P	R	Lt
Existing and future residents and employees	Reduced crime levels through increased local activity	Minor (neighbourhood level)	+	I	P	R	Lt

Notes:
* - = Adverse/ + = Beneficial; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St-Short term/ Mt –Medium term/ Lt –Long term.
**Negligible/Minor/Moderate/Major

Likely Significant Environmental Effects

6.280 The following bullet points set out the likely significant residual effects for the proposed development. As only moderate or major effects are considered significant, the following significant effects would result from the proposed development:

- Generation of construction apprenticeships (beneficial - local level);
- Enhance local labour provision and skills (beneficial - neighbourhood and local levels);
- Uplift in income and expenditure (beneficial - neighbourhood and local levels);
- Council Tax revenue (beneficial - local level);
- New Homes Bonus Payments (beneficial - local level); and
- Business rate revenue (beneficial - local level).

Cumulative Effects

6.281 The following schemes have been assessed in conjunction with the proposed development in order to establish the inter-project cumulative socio-economic effects:

- Site at Hawley Wharf Land Bounded by Chalk Farm Road, Castlehaven Road, Hawley Road, Kentish Town Road and Regents Canal, NW1 (Ref 2015/4562/P);
- Camden Lock Market Site, Chalk Farm Road, NW1 8NH (Ref 2015/4774/P);
- 100,100a and 100b Chalk Farm Road, NW1 8EH (Ref 2013/5403/P);
- 44-44a Gloucester Avenue, NW1 8JD (Ref 2015/1243/P);
- 5-17 Haverstock Hill, NW3 2BP (Ref 2016/3975/P);
- 1 Centric Close London NW1 7EP (Ref 2016/6891/P);
- Marine Ices, 4-8a Haverstock Hill & 45-47 Crogsland Road, NW3 2BL (Ref 2015/0487/P);
- 11 Crogsland Road London NW1 8HF (Ref 2015/0921/P);
- The Roundhouse Theatre Chalk Farm Road LONDON NW1 8EH (Ref 2016/5760/P and 2016/5761/L);
- 28 Camden Wharf Jamestown Road London NW1 7BY (Ice Wharf building) (Ref 2017/1515/P);
- Various minor exterior amendments at Long Stable Stables Market Chalk Farm Road, NW1 8AH (Ref 2017/2155/P et al.);
- 140-146 Camden Street, NW1 (Ref 9PF 2017/1407/P);
- Camden Collection, Agar Grove Estate, Site 1, Agar Grove, NW1 0RG (Ref 2015/6240/P); and
- Camden Collection, St Martin's Walk (Bacton Estate), Haverstock Road, Wellesley Road, Vicars Road, London, NW5 4PT (Ref 2016/5358/P).

6.282 Residential units would be delivered on identified relevant developments for cumulative assessment, which combined with the proposed development, could collectively increase the local housing supply. The development of new employment space would also have a cumulative socio-economic effect when considered alongside the commercial elements of the proposed development. The socio-economic effects during the demolition and construction stage and during the completed development stage are set out in the following sections.

6.283 In addition to the development of the cumulative schemes, the development of HS2 would also generate inter-project cumulative socio-economic effects. Due to the specialist nature of the HS2 development these effects have not been quantified or included within the following assessment. Nevertheless it is expected that the scheme, in conjunction with the proposed development, would generate beneficial socio-economic effects through job creation and productivity.

Demolition and Construction

6.284 The cumulative schemes would generate impacts during the demolition and construction stage. The indicators that are expected to be impacted as a result of the cumulative schemes are:

- **Employment** – approximately 3,200 person years of construction employment would be created during the construction of the schemes, equating to approximately 320 jobs over an indicative 10 year period, and further indirect/induced employment would also be generated. It is expected that the cumulative schemes would generate a temporary **Moderate Beneficial** cumulative effect.
- **Productivity** – the construction of the schemes would generate an increase in GVA equivalent to approximately £80 million per annum within the local economy over an indicative 10 year period, increasing to more than £310 million across the wider economy. It is expected that the cumulative schemes would generate a temporary **Moderate Beneficial** cumulative effect.

Completed Development

6.285 The indicators that are expected to be impacted as a result of the cumulative schemes are:

- **Employment** – approximately 2,900 gross direct jobs would be created through the operation of the schemes and further indirect/induced employment would also be generated. It is expected that the cumulative schemes would generate a permanent **Major Beneficial** cumulative effect relative to the change in baseline conditions.
- **Productivity** – the operation of the schemes would generate an increase in GVA equivalent to circa £50 million per annum within the local economy, increasing to circa £240 million across the wider economy. It is expected that the cumulative schemes would generate a permanent **Moderate Beneficial** cumulative effect.
- **Population, Labour Force and Skills** – the development of new homes would increase overall population levels by approximately 4,050 residents. It is expected that a proportion of new residents would be economically active and employed, therefore enhancing the size and structure and skills of the local labour force. It is expected that the cumulative schemes would generate a permanent **Major Beneficial** cumulative effect relative to the change in baseline conditions.
- **Business Space and Activity –** the provision of additional employment floorspace would increase the supply of business floorspace, in turn attracting new and expanding businesses to the local area increasing levels of business space and activity. It is expected that the cumulative schemes would generate a permanent **Moderate Beneficial** cumulative effect.
- **Housing –** the development of over 1,900 new homes would contribute to the local housing targets and would meet local housing needs, including affordable housing needs. It is expected that the cumulative schemes would generate a permanent **Moderate Beneficial** cumulative effect.
- **Income and Expenditure –** additional household income would be generated by employed residents living in the new homes. The household expenditure generated by the additional new homes and employee expenditure of those working on the cumulative schemes once operational would contribute significantly to sustaining local shops and businesses, which in turn are an important source of local employment. It is expected that the cumulative schemes would generate a permanent **Major Beneficial** cumulative effect relative to the change in baseline conditions.
- **Local Authority Revenue** – businesses pay non-domestic rates (known as business rates) to contribute to the cost of the local authority providing public services within the area that the business property is situated. Businesses occupying new rateable floorspace would generate an uplift in business rate revenue. The new homes would generate an uplift in Council Tax revenue and would result in the payment of New Homes Bonus, providing an important source of revenue funding for the relevant Council. It is expected that the cumulative schemes would generate a permanent **Major Beneficial** cumulative effect relative to the change in baseline conditions.
- **Public Services –** the development of new homes would increase demand for local educational, healthcare and policing services in addition to open space and recreation facilities, which may have significant adverse effects if insufficient mitigation is not provided by each cumulative scheme. Based on the scale and quantity of the cumulative schemes, mitigation measures are likely to be required to offset any significant adverse cumulative effects. Assuming that appropriate mitigation is put in place, for example through CIL and/or Section 106, any significant adverse cumulative effects on public services would be **Negligible to Minor Adverse** and are therefore not considered to be significant in EIA terms.

6.286 As with the proposed development, the majority of socio-economic effects of the cumulative developments would be beneficial.

Summary

6.287 The potential social and economic effects of the proposed development have been assessed during the demolition and construction stage and once completed and operational. To inform the assessment, current baseline conditions were analysed in relation to the local business base and workspace, employment, economic productivity, earnings, population, labour force and skills, economic activity and unemployment, deprivation, housing, local authority revenue, education, health, open space and crime following applicable good practice guidance and legislation.

6.288 The assessment has considered the effects on the neighbourhood impact area of Camden Town with Primrose Hill and Haverstock, the local impact area of LBC and the wider impact area of Greater London.

Demolition and Construction

6.289 The construction of the proposed development would generate approximately 131 gross direct FTE jobs on-site annually, 43 apprenticeship opportunities and economic productivity across the various impact areas, which would give rise to beneficial effects. The effects on employment and productivity would not be significant in EIA terms. However, the effects on construction apprenticeships would be of **Major Beneficial** significance at the local scale.

Completed Development

6.290 The delivery of commercial floorspace as part of the proposed development would generate approximately 998 additional gross direct FTE jobs on-site, and generate a net additional GVA contribution of approximately £17.3 million within the LBC economy each year. The commercial floorspace would increase the provision of business space, which is estimated to generate a net uplift of approximately £2.3 million business rate revenue per annum, and also improve levels of business activity locally.

6.291 Overall, the socio-economic assessment of the proposed development identifies that the effects upon operational employment and business rate revenue would be significant beneficial in EIA terms.

6.292 The socio-economic effects expected to be generated by the provision of 573 new residential dwellings (including affordable homes) as part of the proposed development would include enhancements to the local population, labour force and skills, an uplift in gross earnings (income) equivalent to approximately £21.3 million per annum, £14.0 million in retail expenditure and £8.9 million in leisure expenditure associated with the new residents each year, in addition to further local expenditure generated by employees of the proposed development once completed. This would help to boost the vitality and viability of local shops and businesses, and sustain essential local leisure and support services. The development of the new homes would increase Council Tax revenues by approximately £890,000 annually and generate a total of £2.3 million New Homes Bonus payments. All of these effects would be beneficial. The socio-economic assessment of the proposed development identifies that the effects upon local population, labour force and skills, income and expenditure, Council Tax and New Homes Bonus would be significant beneficial effects in EIA terms.

6.293 The residents of the proposed development would generate demand for 84 primary school places, 60 secondary school places, 0.7 FTE GPs and other health facilities (e.g. dentists, opticians, pharmacies and hospitals), 10,118 – 10,800 m^2 of open space provision and children's playspace. The demands on open space and children's play space would be accommodated through the provision of 12,261 m^2 of various types of public, communal and private open space within the proposed development designed to ensure that public spaces are accessible to all and encourage social interaction within the community. It is expected that the additional demand for the other public services can be accommodated within existing facilities, with the exception of secondary education. The adverse effects in relation to secondary education are not considered to be significant in EIA terms.

6.294 The remaining effects are not considered to be significant.

7 TRANSPORT AND ACCESSIBILITY

Introduction

7.1 This chapter of the ES considers the potential impacts on various means of transport associated with the proposed development and the associated likely effects on sensitive receptors in the study area.

7.2 This chapter describes the methods used to assess potential impacts and likely effects; the baseline transport and accessibility conditions currently existing at and surrounding the application site; the potential impact and likely effects of the proposed development taking into consideration embedded mitigation measures; the need for additional mitigation; and the likely residual effects. Where relevant, the assessment follows the methodology set out in the Institute of Environmental Management and Assessment (IEMA) Guidelines, specifically the document 'Guidelines for the Environmental Assessment of Road Traffic'[1].

7.3 The chapter should be read in conjunction with the Transport Assessment (TA) in ES Volume 3B, which has been produced in respect of the proposed development. The TA provides comprehensive details in respect of the various transport elements of the proposed development including junction modelling, parking provision, servicing strategy, and access by non-car modes. The TA also includes detailed modelled calculations of the potential change in traffic conditions resulting from the proposed development for both the demolition and construction stage and the completed development stage. The calculations are summarised in this chapter and have formed the basis of this assessment.

7.4 The TA also makes reference to the following documents which have been relied upon in undertaking this assessment:

- Outline Construction Traffic Management Plan (CTMP);
- Framework Travel Plan (FTP); and
- Servicing Management Plan (SMP).

Legislation and Policy Context

National Legislation and Policy

National Planning Policy Framework, 2012

7.5 The NPPF[2] places a key emphasis on the need for sustainable development. In respect of highways and transportation issues, paragraph 32 of the NPPF sets out the following requirements:

7.6 *"All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. Plans and decisions should take account of whether:*

- *the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;*
- *safe and suitable access to the site can be achieved for all people; and*
- *improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe."*

7.7 With respect to the impact of developments within the existing road network, paragraph 32 confirms that developments should only be refused where the residual cumulative transport impacts can be defined as 'severe'. Hence, there should not be a presumption that developments must achieve a 'nil detriment' scenario in terms of impact, when compared to background conditions. Consideration should be given to the severity of impacts, on the basis that developments should only be refused where the residual impacts are severe (as per paragraph 32 of the NPPF quoted above).

7.8 The NPPF places emphasis on a considered approach to the issue of sustainability. Paragraph 34 sets out that *"Plans and decisions should ensure developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised. However, this needs to take account of policies set out elsewhere in this Framework, particularly in rural areas"*.

7.9 In addition to the above, paragraph 29 of the NPPF confirms that *"The transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel. However, the Government recognises that different policies and measures will be required in different communities and opportunities to maximise sustainable transport solutions will vary from urban to rural areas".* Paragraph 35 also states that *"Plans should protect and exploit opportunities for the use of sustainable transport modes for the movement of goods and people".* It goes on to set out a list of preferred criteria for the location and design of developments in respect of sustainable travel, such as safe and secure layouts to minimise conflict between traffic and cyclists or pedestrians.

Planning Practice Guidance

7.10 The NPPF is supported by a range of associated PPG. This includes advice on 'Transport evidence bases in plan making and decision taking' (updated March 2015)[3], which provides guidance to assist local planning authorities to assess strategic transport needs and identify suitable mitigation within Local Plans. The PPG documentation also includes 'Travel Plans, transport assessments and statements in decision taking' (updated March 2014)[4]. This document provides general advice on the scope of TAs and where they might be required, taking into account paragraph 32 of the NPPF, although it does not include any specific prescriptive guidance for assessments.

7.11 The PPG also includes a specific section on EIA, confirming where these are required and outlining guidance for preparing such assessments.

Regional Policy

The London Plan Spatial Development Strategy for London Consolidated with Alterations since 2011, 2016

7.12 The London Plan[5] forms the spatial development strategy for London and has been consolidated with alterations since the version adopted in 2011. The Plan sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years.

7.13 The London Plan has been prepared primarily to address key housing and employment issues emerging from an analysis of 2011 Census data. The London Plan also:

[1] Institute of Environmental Management and Assessment, 1993. Guidelines for the Environmental Assessment of Road Traffic.
[2] Department for Communities and Local Government, 2012. National Planning Policy Framework, London. HMSO.
[3] https://www.gov.uk/guidance/transport-evidence-bases-in-plan-making-and-decision-taking
[4] https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements
[5] Greater London Authority, 2016. The London Plan – Spatial Development Strategy for London Consolidated with alterations since 2011. London. GLA.

- develops the concept of the London Plan as the "*London expression of the National Planning Policy Framework*";
- provides a robust, short to medium term planning framework to provide a clear 'direction of travel' for the longer term, recognising that this may well have to be reviewed;
- deals with minor changes in terms of fact;
- responds to changes in national policy;
- provides support for the Mayor's Housing and other strategies; and
- where relevant addresses other advice to the Mayor e.g. from the Outer London Commission.

7.14 Chapter 6 of the London Plan deals with London's transport. Policy '6.1 - Strategic Approach' states that *"The Mayor will work with all relevant partners to encourage the closer integration of transport and development through the schemes and proposals shown in Table 6.1 and by:*

- *Encouraging patterns and nodes of development that reduce the need to travel, especially by car;*
- *Seeking to improve the capacity and accessibility of public transport, walking and cycling, particularly in areas of greatest demand; and*
- *Supporting development that generates high levels of trips at locations with high public transport accessibility and/or capacity*."

7.15 Chapter 6 then provides a range of specific policies relating to transport issues including highway impact, sustainable travel and parking provision.

7.16 Policy '6.3 - Assessing Effects of Development on Transport Capacity' states that development proposals should ensure that impacts on transport capacity and the transport network are fully assessed. TAs should be provided in accordance with TfL guidance and Travel Plans should be provided for applications above the thresholds set out in TfL guidance.

7.17 Policy '6.10 - Walking' states that development proposals should ensure high quality pedestrian environments. At the strategic level there is an emphasis on including the use of shared space principles.

7.18 Policy '7.1 - Lifetime Neighbourhoods' reiterates the aspirations of the transport policies in locating and designing developments to improve people's access to social and community infrastructure, the Blue Ribbon Network, local shops, employment and training opportunities, commercial services and public transport.

7.19 The London Plan sets out standards for car parking (Policy '6.13 - Parking') and cycle parking (Policy '6.9 - Cycling'). It is stated that in locations with high public transport accessibility, car-free developments should be promoted.

Local Policy

London Borough of Camden Core Strategy and Development Policies Document 2010-2025, 2010

7.20 The current Local Development Framework for LBC covers the period from 2010 to 2025, and comprises the Core Strategy[6] and Development Policies[7] documents, which were both adopted by LBC in 2010. These documents set out LBC's vision for the future of the borough, including a variety of policies to guide new development.

7.21 Policy CS11 of the Core Strategy focusses on 'Promoting sustainable and efficient travel' within the borough. Included within Policy CS11 are the following requirements:

7.22 *"As part of its approach to minimising congestion and addressing the environmental impacts of travel, the Council will:*

- *expand the availability of car clubs and pool cars as an alternative to the private car;*
- *minimise provision for private parking in new developments, in particular through: – car free developments in the borough's most accessible locations and – car capped developments;*
- *restrict new public parking and promote the re-use of existing car parks, where appropriate;*
- *promote the use of low emission vehicles, including through the provision of electric charging points; and*
- *ensure that growth and development has regard to Camden's road hierarchy and does not cause harm"*

7.23 With respect to LBC's Development Policies document, polices DP16 to DP21 relate to 'Promoting sustainable and efficient transport'. These policies are relevant to this assessment and cover the following topics:

- 'DP16 – The transport implications of development';
- 'DP17 – Walking, cycling and public transport';
- 'DP18 – Parking standards and limiting the availability of car parking';
- 'DP19 – Managing the impact of parking';
- 'DP20 – Movement of goods and materials'; and
- 'DP21 – Development connecting to the highway network'.

Camden Planning Guidance 7 – Transport, 2001

7.24 LBC has published a range of 'Camden Planning Guidance'[8] documents that supports the policies set out in their LDF, confirming how these should be followed in practical terms. CPG7 relates to transport and includes advice on various issues including; transport capacity, parking, and vehicle access. This assessment has therefore taken the requirements of this guidance document into account in reviewing the various transport elements of the proposed development.

London Borough of Camden Draft Local Plan, 2016

7.25 The emerging Local Plan for Camden[9] will cover the period from 2016 to 2031 is currently in draft and was submitted for Examination in Public in June 2016, with the examination hearings having begun in October 2016. The document is due to be adopted in June 2017, and will replace the existing Core Strategy and Development Polices. As such, whilst this does not yet represent adopted planning policy, the emerging policy requirements have been taken into account within this assessment.

7.26 Chapter 10 of the emerging Local Plan relates to transport and includes four policies (T1 to T4), which cover the following topics:

- 'T1 – Prioritising walking, cycling and public transport';
- 'T2 – Car-free development and limiting the availability of parking';
- 'T3 – Improving strategic transport infrastructure'; and
- 'T4 – Promoting the sustainable movement of goods and materials'.

[6] London Borough of Camden, 2010. Core Strategy 2010-2025. London. LBC.
[7] London Borough of Camden, 2010. Camden Development Policies 2010-2025. London. LBC.
[8] London Borough of Camden, 2001. Camden Planning Guidance 7 – Transport.
[9] London Borough of Camden, 2016. Camden Local Plan – Submission Draft.

Guidance

Institute of Environmental Assessment Guidelines for the Environmental Assessment of Road Traffic, 1993

7.27 This document defines a list of potential environmental impacts within Part C. These include several items related to highways and transportation (such as driver delay), but also include additional elements where traffic can contribute to the cumulative impact (such as the contribution of traffic noise to overall noise levels).

7.28 This assessment focusses on highways, addressing transportation related impacts, while those impacts where traffic is a contributing factor towards an impact are considered in separate chapters (i.e. Air Quality).

7.29 Based on the above distinction, this assessment specifically considers the following potential impacts and likely effects arising from solely highways and transportation related changes to the local environment:

- Highway Network and Junction Capacity;
- Public Transport Capacity;
- Severance;
- Driver Delay;
- Pedestrian Delay;
- Pedestrian Amenity;
- Fear and Intimidation (in pedestrians, arising from vehicular traffic);
- Accidents and Safety; and,
- Hazardous Loads.

Design Manual for Roads and Bridges – Volume 11, Section 3, Part 9 – Vehicle Travellers, 1993

7.30 In addition to the above impacts and effects, Volume 11, Section 3, Part 9 of the Design Manual for Roads and Bridges (DMRB)[10] introduces the concept of 'Driver Stress'. This impact and its resultant effects are therefore also considered within this assessment.

Consultation Feedback

7.31 As discussed in Chapter 2: EIA Process and Methodology, consideration has been given in this assessment to the formal EIA Scoping Opinion (Volume 2: Technical Appendix 2.2) comments provided by the LBC and other consultees (including TfL) in respect to the proposed development. The key considerations are summarised in Table 7.1.

Table 7.1: EIA Scoping Consultation Feedback

Consultee	Comment	Where in the Chapter this comment is addressed
LBC (also incorporating TfL feedback)	Traffic surveys should cover seven days rather than six (Monday to Saturday).	Assessment Methodology section and Baseline Conditions section. The TA includes detailed information on traffic survey data from a weekday and Saturday to reflect typical weekday and weekend conditions. No surveys were undertaken on a Sunday as this would not impact on the proposed number of parking spaces required by Morrison, nor would Sunday surveys be utilised in capacity assessments that rely on weekday modelled traffic flow data supplied by LBC.
	TRICS/Census data should be used in the assessment of trip generation, including defining supermarket public transport trips and reflecting car-free nature of the proposals.	TA and Potential Impacts and Effects section The TA utilises TRICS/Census data as requested.
	The assessment should not assume that all rail trips use Kentish Town West station.	Potential Impacts and Effects section The assessment takes into consideration rail trips using the three nearest stations (Kentish Town West, Kentish Town, and Camden Road).
	Reconfiguration of Chalk Farm Road should take account of planned local pedestrian/cycle improvements. Liaison with the Transport Strategy Team is required.	Potential Impacts and Effects section The proposals for the Chalk Farm Road signal junction have been produced in consultation with LBC (including Transport Strategy Team) and TfL, with a view to accommodating LBC's aspirations where possible.
	The assessment should take into account displaced transport impacts on adjacent roads including Gilbey's Yard and Oval Road.	The TA includes consideration of the use of Gilbey's Yard/Oval Road for taxi pick-ups/drop-offs.
	Impacts of HS2 construction traffic should be taken into account.	Cumulative Effects section
	New junctions shall be designed to operate at less than 90 % capacity and shall include: • all traffic, including cyclists and construction traffic for each phasing, as well as HS2 construction traffic and buses. • a cycle lane departing the MS parcel. • no right turn departing the application site at the junction of Juniper Crescent and Chalk Farm Road	The TA includes details of the proposed signal junction at Chalk Farm Road, which has been designed following detailed negotiations with LBC and TfL.
	A restrained approach to Morrisons supermarket car parking should be adopted (i.e. not based on peak demand).	The detailed approach to car parking has been set out in the TA. Supermarket parking of 300 spaces has been set based on current survey data and Morrisons' operational requirements. Car parking justification is dealt with in the TA and not this assessment because this is a matter relating to local transport policy rather than any specific environmental effects.

[10] Department for Transport, 1993. Design Manual for Roads and Bridges – Volume 11, Section 3, Part 9 – Vehicle Travellers

7.32 Consultation meetings were held with TfL officers on 9 December 2016, 9 May 2017 and 24 May 2017. At these meetings, it was confirmed that no background growth need be applied to the observed 2016 traffic flows used as the future baseline scenario in this assessment, on the basis that TfL does not anticipate any significant growth other than flows attributed to any specific committed/cumulative developments.

7.33 The TA addresses the majority of the above consultation responses in Table 7.1 in detail. This chapter focusses on the potential impacts and likely effects of the proposed development against the defined baseline conditions as calculated in the TA (e.g. traffic flows). It focusses on the key environmental transport impacts and effects as set out in the IEMA Guidelines, taking all modes of transport into consideration.

Assessment Methodology

Study Area

7.34 In accordance with the IEMA Guidelines, the study area has been defined by identifying any link or location where it is considered that significant environmental effects could arise as a result of the proposed development.

Local Highway Network

7.35 The IEMA Guidelines recommend that the study area for environmental assessment be informed by the following two rules:

- Rule 1: include highway links where traffic flows will increase by more than 30 % (or the number of heavy goods vehicles (HGVs) will increase by more than 30 %; and
- Rule 2: include any other specifically sensitive areas where traffic flows have increased by 10 % or more.

7.36 In summary, based on the net change in traffic flows for the proposed development (see traffic flow data in Figure 7.2, the study area for the local highway network comprises the following highway links and junctions:

- Construction and Demolition stage
  - Chalk Farm Road (west);
  - Juniper Crescent; and
  - Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction.
- Completed Development stage
  - Juniper Crescent; and
  - Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction

Pedestrian and Cycle Movement and Facilities

7.37 With respect to walking and cycling, the study area has been established based on the key routes likely to be used for walking and cycling trips to and from the proposed development, taking into account walking trips within a 2 km distance and cycling trips within 5 km of the centre of the application site. These are:

- Juniper Crescent;
- Chalk Farm Road (between Chalk Farm and Camden Town underground stations to the east and west); and
- Oval Road.

Public Transport Services

7.38 The study area for consideration of public transport includes bus stops and underground/rail stations within prescribed walking distances of 640 m for buses and 960 m for underground/rail, as defined by TfL's public transport accessibility level (PTAL) methodology.

7.39 The extent of bus stops considered only extends as far as the first stop to serve each particular service, and this includes stops at the Morrisons terminus and on Chalk Farm Road.

7.40 For London Underground Services, both Chalk Farm and Camden Town stations have been considered, which are both on the northern line. With respect to rail, Kentish Town West London Overground station is included within the walking distance, whilst Kentish Town and Camden Road Stations have also been included based on the Scoping Consultation feedback, even though these are beyond a 960 m walk.

Personal Injury Accidents

7.41 The study area relating to accidents and safety is based on locations in the vicinity of the application site where three or more Personal Injury Accidents (PIAs) have been recorded over the five-year study period, as per the requirements of archived document 'Guidance on Transport Assessment'[11]. The resulting study area is focussed on the following five junctions:

- Chalk Farm Road/Belmont Street junction;
- Chalk Farm Road/Ferdinand Street/Juniper Crescent signals;
- Chalk Farm Road/Harmood Street junction;
- Chalk Farm Road/Hartland Road junction; and
- Chalk Farm Road/Hawley Street junction.

Baseline Characterisation

7.42 Baseline conditions at the application site and within the study area were characterised by means of observations from site visits; results from traffic surveys, parking surveys and a PERS audit; a detailed review of relevant policies; and a review of available highways information such as Personal Injury Accident data[12].

Traffic Surveys

7.43 Weekday and weekend traffic surveys were undertaken within the surrounding highway network, which took place on Thursday 19 May 2016 and Saturday 21 May 2016, between 0700 and 1900 hours. The following junctions were included in the surveys, which are shown in Figure 7.1:

- Junction 1: Chalk Farm Road/Ferdinand Street/Site Access signal junction;
- Junction 2: Chalk Farm Road/Site Egress signal junction;
- Junction 3: Site Access/Site Egress junction;
- Junction 4: Site Egress/PFS entrance/exit;
- Junction 5: Site Access/Juniper Crescent roundabout;
- Junction 6: Morrisons service road/car park access junction; and
- Junction 7: Morrisons car park access/bus terminus junction.

[11] DfT, 2007. Guidance on Transport Assessment.

[12] https://opendata.camden.gov.uk/

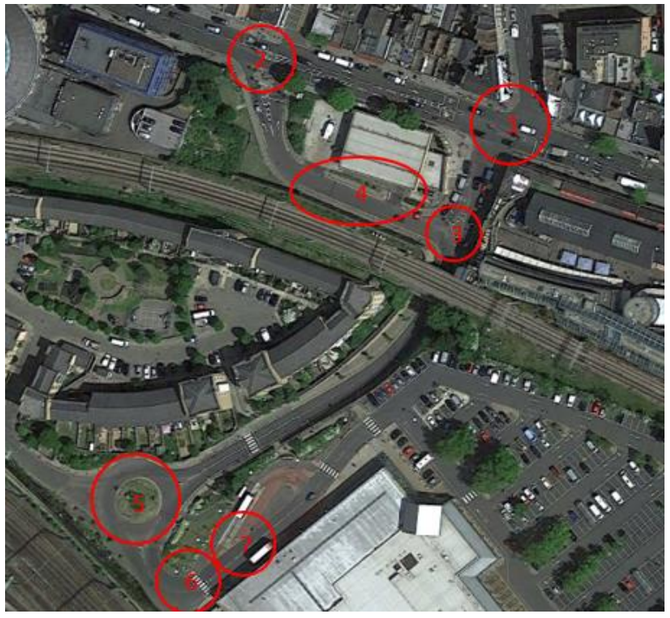

Figure 7.1: Traffic Survey Locations

7.44 The survey scope and methodology was agreed in consultation with LBC and TfL.

7.45 Further to the above surveys being carried out, LBC provided details of passenger car units (PCU[13]) traffic flows at the Chalk Farm Road/Ferdinand Street/Juniper Crescent traffic signals, recorded in May 2016. To avoid inconsistencies in transport modelling undertaken on behalf of the Applicant and by LBC, these PCU flows have been adopted within this assessment, albeit with the site-specific flows from the junctions above used to estimate HGV proportions and movements to and from the existing supermarket and PFS.

Pedestrian and Cycle Facilities

7.46 A review of available pedestrian and cycling routes was undertaken based on multiple site visits and review of available online details, such as local cycle maps and Public Right of Way maps available from LBC and TfL. In addition a Pedestrian Environment Review System (PERS) Audit was undertaken, the scope of which were agreed with the TfL and LBC.

Public Transport Services

7.47 Current bus, underground and rail service frequencies have been derived from the TfL timetables webpage[14]. On-site observations of the existing stops were also undertaken during site visits.

Personal Injury Accident Data

7.48 A review of recent PIA[15] records in the nearby area, covering the five-year period between 2011 and 2015, and including sections of Chalk Farm Road to the east and west.

Method of Assessment

Assessment Scenarios

7.49 Consideration has been given to the potential impacts of the proposed development's demolition and construction stage, as well as its completed development stage.

7.50 Traffic flow modelling was undertaken for the following assessment scenarios:

- Demolition and Construction Stage (temporary supermarket and office traffic flows from PFS parcel and demolition and construction traffic from MS parcel):
  - Existing baseline – 2016 Weekday Peak Hour/Daily and Saturday Inter-Peak Hour/Daily traffic flows;
  - Future baseline – 2024 Weekday Peak Hour/Daily and Saturday Inter-Peak Hour/Daily traffic flows;
  - Future baseline + proposed development; and
  - Future baseline + proposed development + cumulative development.
- Completed Development Stage (Fully Completed Development):
  - Existing baseline – 2016 Weekday Peak Hour/Daily and Saturday Inter-Peak Hour/Daily traffic flows;
  - Future baseline – 2024 Weekday Peak Hour/Daily and Saturday Inter-Peak Hour/Daily traffic flows;
  - Future baseline + proposed development; and
  - Future baseline + proposed development + cumulative development.

7.51 The fully detailed traffic flow calculations (or data) are presented in the TA, with summaries provided in Figure 7.2. These flows have formed the basis for this assessment.

7.52 Traffic flows associated with the cumulative schemes was taken from the TAs and/or ESs for those developments. Following a review of the cumulative schemes' information, no additional cumulative traffic has been taken into account as none of these schemes result in any significant net peak hour or daily traffic increases on the highway network. Accordingly the cumulative scenarios have not been considered other than in relation to the HS2 construction traffic flows for the demolition and construction stage.

7.53 The operational year has been assumed to be 2024; however no background traffic growth has been applied to the 2016 base flows, as agreed with TfL and LBC.

Modelling

7.54 During discussions with the LBC, it was agreed to use their traffic flow data for Chalk Farm Road in order for the junction modelling data used to be consistent with modelling of the network they are currently undertaking themselves. However, this has presented some challenges, as the Camden data is expressed as PCU flows (passenger car units), with no specific details on the proportion of HGVs, and the data also does not include specific details of movements to/from the PFS or further south along Juniper Crescent. As a result, LBC's PCU data has been utilised, but with some of the traffic count data for the application site also interlaced with this data to ensure the traffic flow changes can be fully assessed. The Assumptions and Limitation section below details the assumptions that have been made in this respect.

[13] PCU = passenger car unit, which is equivalent length of an average car
[14] https://tfl.gov.uk/travel-information/timetables/
[15] https://opendata.camden.gov.uk/

	2024 Future Baseline				Demolition and Construction Phase												Completed Development											
	Two-Way Flow				Two-Way Flow				Difference				Percentage Change				Two-Way Flow				Difference				Percentage Change			
Link	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour
Chalk Farm Road (east)	1136	1172	8508	11345	979	1022	7762	10030	-157	-150	-746	-1315	-13.82%	-12.80%	-8.77%	-11.59%	1156	1190	8716	11554	20	18	208	209	1.76%	1.54%	2.44%	1.84%
Chalk Farm Road (west)	973	1031	7485	9981	827	903	7253	9237	-146	-128	-232	-744	-15.01%	-12.42%	-3.10%	-7.45%	994	1050	7711	10214	21	19	226	233	2.16%	1.84%	3.02%	2.33%
Juniper Crescent	242	374	2715	3621	73	69	841	1008	-169	-305	-1874	-2613	-69.83%	-81.55%	-69.02%	-72.16%	271	398	2985	3890	29	24	270	269	11.98%	6.42%	9.94%	7.43%
Ferdinand St	259	256	1858	2478	258	254	1844	2459	-1	-2	-14	-19	-0.39%	-0.78%	-0.75%	-0.77%	259	256	1858	2478	0	0	0	0	0.00%	0.00%	0.00%	0.00%

	2024 Future Baseline				Demolition and Construction Phase (inc. cumulative impact of HS2 and committed development construction traffic)												Completed Development (inc. cumulative impact of HS2 and committed development construction traffic)											
	Two-Way Flow				Two-Way Flow				Difference				Percentage Change				Two-Way Flow				Difference				Percentage Change			
Link	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour
Chalk Farm Road (east)	1136	1172	8508	11345	979	1022	8158	10426	-157	-150	-350	-919	-13.82%	-12.80%	-4.11%	-8.10%	1156	1190	8996	11834	20	18	488	489	1.76%	1.54%	5.74%	4.31%
Chalk Farm Road (west)	973	1031	7485	9981	827	903	7509	9493	-146	-128	24	-488	-15.01%	-12.42%	0.32%	-4.89%	994	1050	7851	10354	21	19	366	373	2.16%	1.84%	4.89%	3.74%
Juniper Crescent	242	374	2715	3621	73	69	1261	1428	-169	-305	-1454	-2193	-69.83%	-81.55%	-53.55%	-60.56%	271	398	3405	4310	29	24	690	689	11.98%	6.42%	25.41%	19.03%
Ferdinand St	259	256	1858	2478	258	254	1844	2459	-1	-2	-14	-19	-0.39%	-0.78%	-0.75%	-0.77%	259	256	1858	2478	0	0	0	0	0.00%	0.00%	0.00%	0.00%

CAMDEN GOODS YARD NET CHANGE IN PCU VEHCILE MOVEMENTS

	2024 Future Baseline				Demolition and Construction Phase												Completed Development											
	Two-Way Flow				Two-Way Flow				Difference				Percentage Change				Two-Way Flow				Difference				Percentage Change			
Link	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour
Chalk Farm Road (east)	185	99	719	958	188	100	733	973	3	1	14	15	1.62%	1.01%	1.95%	1.57%	189	101	733	972	4	2	14	14	2.16%	2.02%	1.95%	1.46%
Chalk Farm Road (west)	147	71	515	686	156	75	729	910	9	4	214	224	6.12%	5.63%	41.55%	32.65%	147	71	528	698	0	0	13	12	0.00%	0.00%	2.52%	1.75%
Juniper Crescent	36	28	203	271	28	28	374	442	-8	0	171	171	-22.22%	0.00%	84.24%	63.10%	30	29	225	293	-6	1	22	22	-16.67%	3.57%	10.84%	8.12%
Ferdinand St	38	28	203	271	38	28	203	271	0	0	0	0	0.00%	0.00%	0.00%	0.00%	38	28	203	271	0	0	0	0	0.00%	0.00%	0.00%	0.00%

	2024 Future Baseline				Demolition and Construction Phase (inc. cumulative impact of HS2 and committed development construction traffic)												Completed Development (inc. cumulative impact of HS2 and committed development construction traffic)											
	Two-Way Flow				Two-Way Flow				Difference				Percentage Change				Two-Way Flow				Difference				Percentage Change			
Link	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour	AM	PM	18 hour	24 hour
Chalk Farm Road (east)	185	99	719	958	188	100	931	1171	3	1	212	213	1.62%	1.01%	29.49%	22.23%	189	101	873	1112	4	2	154	154	2.16%	2.02%	21.42%	16.08%
Chalk Farm Road (west)	147	71	515	686	156	75	857	1038	9	4	342	352	6.12%	5.63%	66.41%	51.31%	147	71	598	768	0	0	83	82	0.00%	0.00%	16.12%	11.95%
Juniper Crescent	36	28	203	271	28	28	584	652	-8	0	381	381	-22.22%	0.00%	187.68%	140.59%	30	29	435	503	-6	1	232	232	-16.67%	3.57%	114.29%	85.61%
Ferdinand St	38	28	203	271	38	28	203	271	0	0	0	0	0.00%	0.00%	0.00%	0.00%	38	28	203	271	0	0	0	0	0.00%	0.00%	0.00%	0.00%

CAMDEN GOODS YARD NET CHANGE IN HGV VEHCILE MOVEMENTS (+3.5t vehicle weight)

Figure 7.2: Summary Traffic Flow Data Used for Assessment Purposes

Assessment Methods

Severance

7.55 DMRB Volume 11, Section 3, Part 8 defines severance as follows:

7.56 *"Community severance is defined … as the separation of residents from facilities and services they use within their community caused by new or improved roads or by changes in traffic flows"*

7.57 Both the DMRB and the IEMA guidelines stress that the sensitivity of an area (and by extension the links within it) will be influenced by the presence of more vulnerable pedestrians such as children and the elderly. Additionally, areas with higher levels of pedestrian activity will be more sensitive to severance. On this basis, the sensitivity of each link in the study area was rated in respect of the potential for severance as follows:

- Low: Rural routes without significant developed frontages or built-form;
- Medium: Rural routes with frequent developed frontages or built-form; and
- High: Urban and suburban routes, which are likely to feature significant levels of pedestrian activity, and also be in close proximity to community facilities and increased numbers of vulnerable pedestrians.

7.58 As stated within the IEMA guidelines, 'The Manual for Environmental Appraisal'[16] found that severance impacts were related to the change in traffic flow on a link, with the relative change being linked to magnitude of impact, as follows:

- 30% change: Slight [Minor] change to severance;
- 60% change: Moderate change to severance; and
- 90% change: Substantial [Major] change to severance.

7.59 In the context of these changes, increases in traffic flow have been considered to result in adverse effects, while reductions in traffic flow have been considered to result in beneficial effects.

Driver Delay

7.60 In simple terms, driver delay is the extent to which a driver is impeded during a journey, such that they are unable to drive at a (legal) speed of their choice, and are unable to proceed freely through junctions on the network.

7.61 As all of the junctions and links within the study area can be considered to be important to the free flow of traffic, it is considered that they all have medium levels of sensitivity to increased driver delay (none are considered to be of high sensitivity as all of these junctions/links are away from the Transport for London Road Network (TLRN) where delays may have more of an impact).

7.62 The magnitude of an impact on driver delay is usually quantified only for junctions (as opposed to links) by use of various software packages (including ARCADY, PICADY, and LINSIG). The IEMA guidance notes at paragraph 4.34 that these *"…delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system."* The review of driver delay in this assessment has therefore focussed on changes in delays at the proposed Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction, which is the sole junction included in the study area.

7.63 The LinSig software package utilised to model delay at signal junctions contains multiple delay parameters, both for individual links approaching the junctions, and the junction as a whole. In addition, the capacity of a junction can vary significantly throughout the day owing to the tidality of traffic flows and the level of demand. As such, the magnitude of impact at any given junction has been determined on a qualitative basis, examining the results of capacity analysis within the TA using sound engineering judgment.

7.64 Many transportation chapters within an ES are required to consider journey length as an impact, usually where changes to the network require drivers to use different routings to those previously used. However, in this instance the only such change to the network requiring drivers to change their previous route is the consolidation of the existing separate access/egress signal junctions at Chalk Farm Road to a single 'all movements' junction. The modelling results presented in the TA, confirm that this junction change would result in only a minor change in the overall journey length, and in general journey lengths would be shortened, particularly for traffic using Ferdinand Street and Chalk Farm Road (east). In any case the qualitative review of the highway capacity assessment results has taken this change into account with respect to driver delay. Accordingly, journey length has not been considered in this particular assessment.

Pedestrian Delay

7.65 The IEMA guidelines cite work by HFA which found that on a link with no formal crossing points and two-way vehicle flows of 1,400 vehicles per hour, typical pedestrian delays were in the order of 10 seconds. It is considered that such a level of delay is insignificant, and that only if links have flows significantly higher than this should pedestrian delay impacts be considered.

7.66 Examination of the future baseline completed development peak hour traffic flows (see Figure 7.2) show that this threshold would not be exceeded on any of the four links in the study area. Accordingly, only a brief qualitative assessment of pedestrian delay within the study area has been undertaken.

Pedestrian Amenity

7.67 Within the IEMA guidelines pedestrian amenity is very broadly defined as the overall pleasantness of a pedestrian's journey. It can be affected by traffic flows, pavement widths, the proximity of pedestrian routes to the live carriageway, noise, pollution and the interactions between pedestrians and traffic.

7.68 The IEMA guidelines suggest only a very tentative threshold for pedestrian amenity impacts based on the doubling (or halving) of vehicular traffic, and so this approach has been adopted when considering the likely effects on pedestrian amenity.

Fear and Intimidation

7.69 The IEMA guidelines state that fear and intimidation are caused by high vehicle flows, high portions of traffic comprising HGVs, and by high vehicle speeds. These cause pedestrians to perceive a degree of hazard. It also notes that they are increased by the lack of (or substandard provision of) pedestrian footways.

7.70 It is considered that the sensitivity of routes to fear and intimidation is broadly similar to that for severance (detailed above). However, in addition to this, it is considered that any route lacking reasonable pedestrian facilities should be considered one level more sensitive than a similar route with appropriate such provision.

7.71 As stated within the IEMA guidelines, the scale of fear and intimidation effects can be established by considering the magnitude of each impact, and then taking a (weighted) average). Suitable magnitude thresholds for each element are included within the guidance, and have been reproduced below in Figure 7.3 for ease of reference.

[16] Institute of Environmental Management and Assessment, 1983. The Manual for Environmental Appraisal.

Example of Fear and Intimidation

Degree of hazard	Average traffic flow over 18 hour day vehicle/hour	Total 18 hour heavy goods vehicle flow	Average speed over 18 hour day mile/hour
Extreme	1800 +	3000 +	20 +
Great	1200-1800	2000-3000	15-20
Moderate	600-1200	1000-2000	10-15

Source: Crompton (1981)

Note: The traffic components can be weighted to give an overall score of fear and intimidation corresponding to particular combinations of traffic flow, speed and composition.

Figure 7.3: IEMA Guidelines Fear and Intimidation Criteria[17]

7.72 Where flow levels are lower than those shown in Figure 7.3, it considered that these are 'slight' hazards. When establishing the average level of perceived hazard, all three elements have been weighted equally, with a 'slight' [minor] hazard being valued at 1, and an 'extreme' [major] hazard being valued at 4. The resulting score has then been rounded to the nearest whole number.

7.73 Increased fear and intimidation have been considered to have adverse effects, while reductions in fear and hazard have been considered to have beneficial effects.

Accidents and Safety

7.74 With regard to accidents and safety, the TA has examined the PIA records for the local area and determined sites of potential concern for further analysis (referred to as 'clusters'). Such analysis is somewhat limited by the data available (for reasons of confidentiality and data protection not all accident details are provided as public information) but in essence focuses on the likely cause of each individual accident, the vehicles involved and their movements. Having established these, the analysis then seeks to identify patterns or trends in accident occurrence.

7.75 For the purposes of this ES, it has been considered appropriate to perform an accident and safety impact assessment at any link that was identified as having one or more accident cluster sites. Initially all such junctions and links was considered to be of low sensitivity, but was upgraded by one level if they feature more than 10 PIAs. They were also upgraded one level if they included any fatal accidents. Where a link has had a cluster of accidents and additional isolated accidents, only those within the cluster have been considered, as it is only at these locations that a specific accident hazard may have been identified.

7.76 The IEMA guidelines support an initial assessment of impact magnitude based on vehicle-kilometres. Given in most cases the length of a link or area of a junction remain near constant, it is considered reasonable to use vehicle flows as a proxy for this. As such, a percentage change in vehicle flows will lead to a similar change in accident risk.

7.77 It is considered a reasonable approximation to multiply the percentage change of vehicle flow (and thus accident risk) by the number of accidents that occurred in the five-year study period examined by the TA, in order to estimate the number of additional accidents that may occur in the future. For example, if the proposed development causes a 10 % increase in flow through a cluster site that had 10 accidents occur during the TA study period, it is reasonable to assume that one additional accident may occur during a future study period of similar length.

7.78 Having due regard to the above, a change of one PIA has been considered small, of two to four PIAs has been considered medium, and of five PIAs or more (i.e. one or more per year over a five-year study period) has been considered high. However, where there is reason to believe that changes arising from the proposed development would make a route more or less safe, such effects have also been considered prior to determining the likely magnitude of effect of the proposed development on a given junction or link.

7.79 Increased accident risk is considered to result in adverse effects, while reductions in risk have been considered to result in beneficial effects.

Hazardous Loads

7.80 Given the nature of the proposed development, it is not envisaged that it would generate any hazardous loads once operational. There may be occasional hazardous loads delivered to the application site during the demolition and construction period. These would most likely be over-sized loads (e.g. large beams or roof trusses) as opposed to hazardous substances. However, given the very low instance of such loads, and associated traffic management measures that would be required for any such movements, the resultant effects are unlikely to be significant and this assessment has not therefore considered such loads. Nonetheless, it is intended that the impacts of these would be managed in accordance with a CTMP to be prepared by the Applicant (see Outline CTMP in TA, ES Volume 3A), and on a 'load-by-load' basis during the demolition and construction stage.

Driver Stress

7.81 Within the DMRB, driver stress is very broadly defined as the adverse mental and psychological effects experienced by a driver on the local highway network. It can be affected by three overall categories of impact: frustration (often caused by delays), fear of accidents and uncertainty about the route being followed.

7.82 Based on the guidance given, it can be seen that driver stress is actually influenced by multiple factors, some of which are assessed independently within this assessment. However, given that most other impacts and effects do not directly consider vehicle drivers, it is considered appropriate to consider driver stress in its own right within this chapter.

7.83 Correlations between various factors and driver stress are hard to draw, and the only data available within the DMRB relates to vehicular flows along a link, as compared with vehicle speed. However, in most cases it is apparent that single carriageway roads will be 'high' stress environments, as they only have a single lane in each direction, and such even relatively low levels of traffic require a driver to concentrate, especially on lower speed roads in urban and suburban areas. Consequently, the magnitude of impact arising from driver stress has been discussed and determined on a qualitative basis, examining the findings of the TA and the rest of this assessment using qualitative engineering judgment.

Highway Network Capacity

7.84 Capacity assessment software including PICADY, ARCADY and LinSig is utilised to model the performance of specific junctions within an agreed study area. In this instance a single signal-junction was modelled in LinSig, which is the proposed reconfigured Chalk Farm Road/Ferdinand Street/Juniper Crescent junction. The LinSig software provides results including the Degree of Saturation of each lane, along with predicted queues and delays. A qualitative review of these results, taken as a whole, was undertaken.

[17] Table extracted from Page 37 of the "Guidelines for the Environmental Assessment of Road Traffic" (Institute of Environmental Assessment, 1993)

Public Transport Capacity

7.85 Predicted increases in peak hour passenger trips by bus, underground and train are used in tandem with predictions of which routes might be used to establish the increase in passengers on any particular service. In consultations with TfL, it was confirmed that TfL will review the predicted increase in trips and the impacts on capacity once the planning application has been submitted. In the meantime a qualitative review of the effects of increased demand has been carried out in this assessment.

Significance Criteria

7.86 For the purposes of this assessment, it should be noted that (unless stated otherwise) all transportation related impacts and effects are considered to be:

- long-term (+5 years) for the completed development and medium-term (1-5 years) for the demolition and construction works (no short-term effects, which would be less than one year);
- permanent for the completed development (as the development would generate travel demands as long as it is occupied), and temporary for the demolition and construction works;
- reversible (in that the impacts and effects caused by vehicular traffic can be reversed by removing or re-routing said traffic); and
- direct (as the impacts and effects of traffic are directly experienced by all road users).

7.87 Each transport-related effect has been characterised as either adverse, neutral or beneficial. The scale of significance of each effect has been defined as either negligible, minor, moderate or major. The residual effects of moderate or major significance would typically be the 'likely significant environmental effects' of the proposed development.

7.88 The significance of effects has been expressed as the relationship between the sensitivity of a particular receptor and the magnitude of the potential impact. The approach in Table 7.2 has been used to determine the significance of any effects.

Table 7.2: Significance Criteria

Receptor Sensitivity	Magnitude of Potential Impact			
	High	**Medium**	**Small**	**Negligible**
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

7.89 The magnitude of impact for each assessment criteria has either been set out in the Assessment Methods section above or have been based on engineering judgement. As for the sensitivity of each receptor, these are set out for each assessment topic in the Potential Impacts and Effects section.

Assumptions and Limitations

7.90 The assessment has been based on the following assumptions in relation to future traffic flow conditions:

- Given the lack of available details relating to potential construction traffic associated with HS2, assumptions on maximum daily vehicle movements have been made based on data available in the EIA for HS2[18], albeit noting that these predictions could be subject to change;
- With respect to the proposed development's demolition and construction traffic, the predicted maximum number of daily movements detailed in the Outline CTMP (see TA in ES Volume 3A) has been adopted in this assessment as a worst-case; and
- As described above, no background traffic growth has been applied to the 2016 baseline flows, as agreed with TfL.

7.91 As detailed later in this assessment, the traffic flow data used in this assessment has some limitations, due to the LBC requirement to merge PCU traffic flows supplied by LBC with site-specific traffic counts originally undertaken for the purposes of the TA. However, the LBC data was recorded in May 2016, as were the site-specific traffic surveys, and so this data is considered to correlate sufficiently so as to materially affect the conclusions of this assessment.

7.92 Other assumptions relevant to the traffic data are as follows:

- Flows provided by Camden are PCU flows from counts undertaken in May 2016;
- It is assumed that the bus services along Juniper Crescent will continue uninterrupted during the demolition and construction works;
- The proportion of movements at the Juniper Crescent/PFS junction has been calculated based on LBC's PCU flows and the proportion of turning movements from the survey data;
- 18 and 24 hour baseline flows were derived from PM Peak using factors of 7.26 and 9.68, respectively; and
- Daily development flows (e.g. the temporary supermarket, residential units etc.) have been added in full to both the 18hr and 24hr flows (for simplicity/robustness).

Baseline Conditions

Current Baseline

7.93 In order to assess the potential impacts and likely effects of the proposed development, it is necessary to determine the environmental conditions, resources and sensitive receptors that currently exist on the application site and in the study area.

Existing Site Use and Location

7.94 The application site occupies an area of 3.26 ha and comprises the following two parcels of land divided by a railway line:

- MS parcel; and
- PFS parcel.

7.95 The MS parcel is located to the south-west of Chalk Farm Road, towards the north-western end of Camden Town Centre and includes the Morrisons supermarket and associated car park, which are located to the south-west of the Northern Line underground rail line. The PFS parcel is situated in between Chalk Farm Road and the Northern Line. The MS parcel is bound by the site access road to the north-west, the Northern Line to the north-east, residential properties to the south-east, and national rail lines to the south-west.

7.96 The existing Morrisons supermarket measures 7,203 m^2 gross floor area, of which 5,018 m^2 is retail store floor space. As well as retailing food and groceries, the supermarket also includes other services such as an in-supermarket café, dry-cleaning, and a pharmacy.

7.97 The supermarket's current opening hours are 0800 to 2300 hours Monday to Friday, 0700 to 2300 hours on Saturday, and 1000 to 1600 hours on Sundays.

Pedestrian Network and Facilities

7.98 There are two main pedestrian routes connecting the application site with the surrounding network. The first is via footways located on both sides of the application site access road extending from Chalk Farm Road, which measure between approximately 2 and 4 m wide. The south-eastern footway provides direct

[18] HS2 Ltd, 2013. London-West Midlands Environmental Statement.

access to the application site via two footpath links, and a Zebra crossing is located outside one of these links on the access road, providing a convenient crossing opportunity for pedestrians using the opposite footway.

7.99 The alternate route into the application site is via a footpath link at the south-eastern edge of the supermarket car park, which links to footways on Oval Road. The footways on Oval Road provide direct access to a public footpath that extends along the Grand Union Canal, which provides a traffic free walking route to some of the surrounding areas.

7.100 Beyond the routes described above, and within a 2 km walk distance, the surrounding area includes a comprehensive network of footways and crossings along key routes, including footways on both sides of Chalk Farm Road and signal-controlled crossings in the vicinity of the application site access junction on this road.

7.101 A comprehensive review of pedestrian routes in the vicinity of the application site was undertaken as part of a PERS audit, further details of which are included in the TA. The audit does not highlight the need for any specific mitigation beyond that which would be delivered as part of the proposed development, as the surrounding pedestrian environment is generally rated as being of good quality.

Cycling Network and Facilities

7.102 TfL's 'Local Cycling Guides'[19] identify several recommended and signed cycle routes in the vicinity of the application site. These include a variety of local roads recommended for cycling, including parts of Chalk Farm Road. There are also some off-road cycle routes within a reasonable 5 km cycle distance of the application site, including the canal towpath as it extends to the south.

7.103 There are existing cycle parking facilities at the MS parcel, with a total of 24 Sheffield cycle stands spread across three areas around the supermarket's perimeter (all of which are undercover), resulting in a total provision of 48 cycle spaces (2 bikes per stand).

Public Transport Accessibility Level

7.104 The PTAL rating for the application site has been derived using the TfL Web-based Connectivity Assessment Toolkit (WebCAT)[20]. The PTAL provides an indication of the level of connectivity of a site to the public transport network. It is based on the weekday morning peak period service frequency of all bus services accessible from stops within a 640 m walk distance, as well as rail services accessible from stations within a 960 m walk distance.

7.105 The PTAL is measured on a scale of 1a to 6b, where 1a is the worst (least accessible) and 6b is the best in terms of accessibility. Based on the details on WebCAT, the PTAL rating varies across the application site from between 2 and 6, at a 2021 forecast year, noting that the rating at the current supermarket entrance is 6a (excellent), or 5 based on a 2011 baseline year. The PTAL score for the majority of the application site is 4 or above, and is as high as 6 in some parts of the application site, and so on average across the application site as a whole could be considered to be 5, based on professional judgement and noting that a single score cannot be calculated for a large site as walking distances from various points within the site vary significantly.

Public Transport Network and Services

Bus

7.106 There are a number of bus stops situated within close proximity of the application site, most notably the bus stops/waiting area adjacent to the Morrisons supermarket, which forms part of the access into the car park. These stops immediately outside the supermarket serve Route Numbers 27 and 393:

- Route Number 27 operates between the supermarket and Chiswick Business Park, with a weekday service frequency of one service in each direction every 5 to 9 minutes between 0700 and 1900 hours.
- Route Number 393 operates between the supermarket and Clapton Pond, with a weekday service frequency of one service every 8 to 12 minutes between 0700 and 2000 hours.

7.107 Beyond the application site there are a number of bus stops on the surrounding roads, including stops on Chalk Farm Road approximately 60 m to the south-east of the signal-controlled site access/egress junctions. These stops serve additional routes, providing opportunities to travel to a wider range of areas including Camden Town and Trafalgar Square.

Rail

7.108 The application site is located approximately between two stations on the Northern Line underground line, with Camden Town Station approximately 600 m to the south-east and Chalk Farm approximately 350 m to the north-west. The Northern Line extends into Central London to the south of the application site, providing access to several key interchange stations including Euston and King's Cross St Pancras, allowing access to other underground lines and national rail services. Services from these stations run every 3 minutes on average in each direction during the weekday daytime, which comprises services on both the Bank and Charring Cross branches.

7.109 The nearest rail station accessible on foot is Kentish Town West, which is located approximately 800 m walking distance from the application site to the north. This station provides access to regular rail services to destinations including Stratford, Richmond and Clapham Junction. Other nearby stations within a potential walking distance include Kentish Town and Camden Road, which are both just over 1 km's walk distance away.

Local Highway Network

7.110 Figure 7.1 shows that the current Morrisons supermarket on the MS parcel is served by an existing roundabout located at the southern end of the access road leading from Chalk Farm Road. This roundabout includes three-arms and the north-western arm forms a cul-de-sac serving residential properties at Juniper Crescent, whilst the south-eastern arm leads directly into the application site and the north-eastern arm extends towards Chalk Farm Road. The carriageway measures approximately 7.3 m wide as it extends between the roundabout and Chalk Farm Road, with a single lane in each direction and footways on both sides.

7.111 The access road connects to Chalk Farm Road via two linked signal-controlled junction arrangements. Directly north of the access road is a four arm staggered signal-controlled junction where the southern arm is forms a one-way link leading to the application site. The Chalk Farm Road arms both include two approach lanes and cater for all movements, whilst the Ferdinand Street arm to the north permits left turns to Chalk Farm Road only. The junction incorporates signal-controlled crossings at all arms except for Chalk Farm Road (east).

7.112 Immediately to the south of the above signal junction, the access road comprises two lanes, one of which leads south to the Morrisons supermarket, the other of which leads to a give-way line that extends into a loop road circulating the PFS, which connects back to Chalk Farm Road further west.

7.113 The PFS parcel is served direct from this loop road via separate access/egress points. The loop road then extends to a three-arm signal-controlled arrangement with Chalk Farm Road that accommodates all traffic departing the application site via separate left and right-turn lanes, with no inbound movements permitted at this junction. In combination these two-signal junctions accommodate all arrivals and departures at the application site (except for any originating from the properties at Juniper Crescent).

[19] TfL, 2016. Local Cycling Guide 7.

[20] https://tfl.gov.uk/info-for/urban-planning-and-construction/planning-with-webcat/webcat

7.114 Chalk Farm Road is a classified 'A' road (A502) that extends in a north-west/south-east direction. It forms a strategic road link between Camden Town to the south and Hampstead to the north, and further south it connects to part of the 'North Central Area' of Transport for London Road Network (TLRN), including the A400 and A4200. In the vicinity of the application site, the A502 passes through other nearby signal-controlled junctions, including a signal junction with the B509 to the north-west and a signal junction with Castlehaven Road to the south-east.

7.115 The access road leading south from Chalk Farm Road falls within the red line boundary of the application site, with the exception of a section passing below the railway bridge (controlled by Network Rail).

Baseline Traffic Flows

7.116 Figure 7.2 summarises the baseline 2016 traffic flows on the key links in the vicinity of the application site.

Personal Injury Accident Data

7.117 The TA includes a review of recent PIA records in the nearby area, covering the five-year period between 2011 and 2015, and including sections of Chalk Farm Road to the east and west. The TA identifies five locations where clusters of three or more accidents have occurred during the study period and reviews these accidents in further details to identify any particular trends that could potentially be exacerbated. The following clusters have been considered within this assessment, which are shown in Figure 7.4:

- Chalk Farm Road/Belmont Street junction;
- Chalk Farm Road/Ferdinand Street/Juniper Crescent signals;
- Chalk Farm Road/Harmood Street junction;
- Chalk Farm Road/Hartland Road junction; and
- Chalk Farm Road/Hawley Street junction.

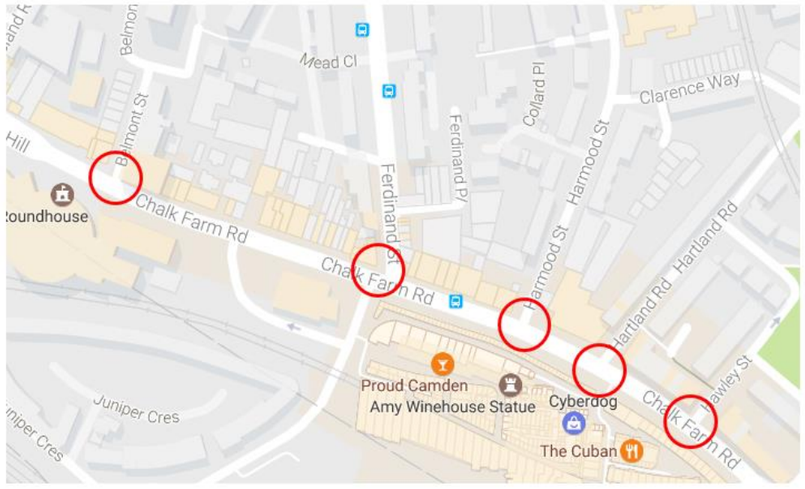

Figure 7.4: Accident Cluster Locations

Future Baseline

7.118 The TA considers a future year of 2024, which represents the opening year and exceeds the minimum requirement of the planning application year of 2017 + 5, as set out in relevant guidance (e.g. Guidance on Transport Assessment[21]). However, as described earlier in this assessment, no growth has been applied to these flows as per the agreed approach with TfL and LBC. As such, the future baseline is the same as the baseline conditions set out above.

Sensitive Receptors

Existing Sensitive Receptors

7.119 Identification of potential existing sensitive receptors that could be affected by transport impacts associated with the proposed development has been based around the key assessment topics set out earlier in this chapter (e.g. severance, driver delay etc.). The potential existing sensitive receptors are considered to comprise all users of the following links (including pedestrians, cyclists, public transport users and vehicle drivers):

- Juniper Crescent;
- Chalk Farm Road (west);
- Chalk Farm Road (east); and
- Ferdinand Street.

7.120 Other sensitive receptors include the existing footways on the above routes and on Oval Road to the east, and the local bus stops and underground/rail stations described earlier in this chapter.

7.121 The assessed sensitivity of links is summarised below:

- Juniper Crescent – High
- Chalk Farm Road (east) – High
- Chalk Farm Road/Belmont Street junction - Low
- Chalk Farm Road/Ferdinand Street/Juniper Crescent signals - Medium
- Chalk Farm Road/Harmood Street junction - Low
- Chalk Farm Road/Hartland Road junction - Low
- Chalk Farm Road/Hawley Street junction – Low
- Pedestrian, Cycle and Public Transport facilities – Low

New Sensitive Receptors

7.122 Future sensitive receptors introduced to the application site would include all users of the reconfigured Juniper Crescent, which would include new bus laybys and bus stops, along with a widened footway at the eastern edge below the existing railway bridge. In addition to users of these routes (such as supermarket customers), future receptors would also include new residents of the proposed development.

Potential Impacts and Likely Effects

7.123 The following section describes the potential transport and accessibility impacts and likely effects resulting from proposed development during both the demolition and construction stage and the completed development stage, taking into consideration embedded mitigation.

Demolition and Construction

Embedded Mitigation

7.124 Information related to the demolition and construction works are provided within Chapter 5: Demolition and Construction of this ES which includes an indicative construction programme, predicted construction traffic flows, vehicle routing, the proposed hours of working, as well as mitigation measures that would

[21] DfT, 2007. Guidance on Transport Assessment

be adopted to avoid adverse effects. The information has taken account of the Outline CTMP in the TA (see ES Volume 3A).

7.125 As indicated in ES Chapter 5: Demolition and Construction Environmental Management, the proposed development works would be sequenced as follows:

- PFS parcel Enabling, Demolition, Construction of Block G and Fit Out for temporary supermarket use at ground floor and offices above; MS parcel fully operational;
- PFS parcel operational as temporary supermarket and office use (on-site receptors); MS parcel Enabling, Demolition and Construction of Blocks A,B,C; and
- PFS parcel conversion of Block G from temporary supermarket to PFS; MS parcel supermarket operational, Blocks B and C near complete with Blocks A, D, E1, E2 and F under construction.

7.126 For the purpose of this assessment the temporary supermarket and office use on PFS parcel, together with the demolition and construction of the MS parcel have been identified as the worst case scenario for assessment.

7.127 The traffic flows for this scenario have been based on the traffic survey and TRICS data included in the TA, and demolition and construction data provided by Barratt. The traffic flows are presented in Figure 7.2 for ease of reference; however in summary would comprise the following:

- Up to 85 daily two-way HGV movements associated with demolition and construction of the MS parcel; and
- Up to 1,776 daily two-way vehicle movements associated with the operation of the temporary supermarket at the PFS parcel.

7.128 The proposed reconfiguration of the Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction would be implemented at the beginning of the demolition and construction stage, as would delivery of the new bus laybys on Juniper Crescent to replace the existing bus terminus, along with two Zebra crossings. A pedestrian refuge crossing would also be provided at Chalk Farm Road (west).

7.129 A total of 65 car parking spaces will be provided for the temporary store. Whilst this exceeds standard maximum requirements set out in the London Plan (48 spaces), TfL have indicated that this will nevertheless be acceptable given the temporary nature of the use and the need for Morrisons to retain existing customers. There will also be 46 internal cycle parking spaces for the store/offices, and 16 external short-stay cycle spaces (8 stands).

7.130 An outline CTMP has been produced for the proposed development and is included within the TA, which would ensure that all construction traffic is managed to minimise the impacts on the existing road network and identified receptors. The standard measure to be covered in the CTMP have also been summarised within ES Chapter 5: Demolition and Construction. This chapter forms the framework for a CEMP to be secured by means of an appropriately worded planning condition, and to be implemented at the application site.

7.131 The CTMP will form the basis of a more detailed CTMP that will be produced prior to demolition and construction. The CTMP sets out a range of best practice measures including:

- Avoiding traffic occurring during peak periods, with all movements occurring between 0930 and 1630 hours on weekdays and 0800 to 1300 on Saturdays;
- Routing all construction traffic to the west along Chalk Farm Road towards the North Circular, to avoid impacts on Camden High Street;
- Deploying banksmen to manage arrivals and departures of construction vehicles; and
- Timetabling deliveries and avoiding overlaps between HGV movements.

Severance

7.132 With reference to the methodology set out earlier in this chapter, the severance effects within the identified study area during demolition and construction are presented in Table 7.3.

Table 7.3: Demolition and Construction Severance Effects

Link	Sensitivity	Max. % change in HGV flows (daily)	Magnitude of Impact	Significance of Effect
Juniper Crescent	High	63.10%	Medium	Major Adverse
Chalk Farm Road (west)	High	32.65%	Small	Moderate Adverse

7.133 Based on the results presented in Table 7.3, temporary moderate to major adverse severance effects could arise during the demolition and construction stage, which would be significant. However, the assessment of severance is based in the changes in HGV flows and does not take into account the net reduction in daily movements by all traffic on these roads as a result of the temporary closure of the Morrison supermarket on the MS parcel and the PFS. Accordingly, on balance, it is considered the effect would be temporary **Minor Adverse**.

Driver Delay

7.134 LinSig capacity assessments of the proposed Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction in the TA confirm that the completed development traffic scenario would have more significant implications in terms of delays than the temporary demolition and construction traffic (due to Morrison supermarket and PFS parcel trips being temporarily absent). As a result, this detailed assessment of driver delay focusses on the completed development scenario only, as detailed below, and the effect during demolition and construction would be temporary **Negligible**.

Pedestrian Delay

7.135 In terms of overall traffic movements, the completed development flows on all roads in the study area would be higher than in the demolition and construction stage, and so this section focusses on pedestrian delays during the completed development scenario only. As such, the effects during demolition and construction are considered to be temporary **Negligible**.

Fear and Intimidation

7.136 Based on the methodology set out earlier in this chapter, the fear and intimidation effects on pedestrians during demolition and construction are summarised in Table 7.4 and Table 7.5.

Table 7.4: Demolition and Construction Fear and Intimidation Hazard Level

Link	Baseline				Demolition and Construction			
	18-hr av. hourly flow	18-hr total HGV flow	Av. Speed	Overall Hazard Level	18-hr av. hourly flow	18-hr total HGV flow	Av. Speed	Overall Hazard Level
Juniper Crescent	151 (slight)	203 (slight)	15-20mph (great)	Moderate	47 (slight)	374 (slight)	15-20mph (great)	Moderate
Chalk Farm Road (west)	416 (slight)	515 (slight)	15-20mph (great)	Moderate	418 (slight)	729 (slight)	15-20mph (great)	Moderate

Table 7.5: Demolition and Construction Fear and Intimidation Effects

Link	Sensitivity	Baseline Hazard Level	D+C Hazard Level	Magnitude of Impact	Significance of Effect
Juniper Crescent	High	Moderate	Moderate	No impact	No effect
Chalk Farm Road (west)	High	Moderate	Moderate	No impact	No effect

7.137 The above details confirm that there would be no change in the hazard level when adding demolition and construction traffic to the future baseline flows, and so there would be **No** effect.

Pedestrian Amenity

7.138 The IEMA guidelines indicate that there could be impacts on pedestrian amenity where traffic flows are more than doubled or halved. The two-way flow data at Figure 7.2 confirms that this would not be the case during the demolition and construction stage, and so the effects would be temporary **Negligible**.

Accidents and Safety

7.139 Based on the methodology set out earlier in this chapter, Table 7.6 sets out the effects of the demolition and construction stage traffic changes on accidents and safety at each of the five accident clusters reviewed in the TA. Morning peak hour flows are used to define the percentage changes, as these are the most pronounced changes, and therefore represent the worst case.

Table 7.6: Demolition and Construction Accidents and Safety Effects

Location	No. of accidents	Sensitivity	% flow change (peak hour)	Magnitude of impact	Significance of effect
Chalk Farm Road/ Belmont Street junction	9	Low	-15.01%	Small (-1 accident)	Negligible
Chalk Farm Road/ Ferdinand Street/Juniper Crescent signals	14	Medium	-13.82%	Medium (-2 accidents)	Moderate Beneficial
Chalk Farm Road/ Harmood Street junction	5	Low	-13.82%	Small (-1 accidents)	Negligible
Chalk Farm Road/ Hartland Road junction	8	Low	-13.82%	Small (-1 accidents)	Negligible
Chalk Farm Road/Hawley Street junction	5	Low	-13.82%	Small (-1 accidents)	Negligible

7.140 Table 7.5 confirms that the effects of the proposed development on the risks of PIA would be temporary **Negligible** to **Moderate Beneficial**, owing to the reductions in peak hour movements.

7.141 With respect to the Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction, this would be reconfigured as part of the proposals (embedded mitigation), and the new layout would be subject to standard Road Safety Audit processes, to ensure there would be a **Negligible** effect on safety.

Driver Stress

7.142 As described earlier in this chapter, driver stress primarily comprises frustration (e.g. owing to delays), fear of accidents, and uncertainty. The first two of these characteristics are assessed within the sections above, and so this section provides a qualitative review of the likely effects on uncertainty on driver stress.

7.143 During the demolition and construction stage there would be a new road layout along at the Chalk Farm Road signals and along Juniper Crescent, with the new temporary supermarket also in place. This may lead to some uncertainty, as drivers become familiar with these temporary arrangements (e.g. regular supermarket customers adjusting to the use of the temporary supermarket). The limited parking provision at the temporary supermarket could also add to uncertainty as to whether a parking space will be available. It is considered that this would be a temporary **Moderate Adverse** effect in the medium-term, which is considered to be significant.

Highway Network Capacity

7.144 The net traffic flow changes in Figure 7.2 confirm that there would be net reductions in peak hour and daily movements on all four links that have been considered due to the temporary closure of the Morrison supermarket on the MS parcel and the PFS. This would be a medium magnitude of impact on a high sensitive receptor, and so the effect of this impact on these links are therefore considered to be temporary **Minor Beneficial**.

7.145 The LinSig modelling for the proposed Chalk Farm Road signal junction has only considered the completed development flows as total flows at this junction would be lower in the demolition and construction stage. As a result, the overall effect would be **Negligible**.

Public Transport Capacity

7.146 With respect to public transport trips, the only increases that might be generated by the temporary supermarket and offices on the PFS parcel and the construction workers on the MS parcel would be offset by the fact that the PFS and Morrison supermarket at the MS parcel would not be operational. As such, the effect on public transport capacity is considered to be temporary **Negligible**.

Completed Development

7.147 The completed development would comprise the redeveloped MS parcel, along with reinstatement of the PFS at the PFS parcel in addition to the operational offices. The TA includes detailed trip generation calculations for this scenario, with the resulting peak hour person trip generation by each mode of travel shown in Table 7.7 (these figures exclude existing demand associated with the Morrison supermarket and PFS, which would remain as existing).

Table 7.7: Completed Development Trip Generation

Proposed Development	Weekday am peak hour			Weekday pm peak hour		
	In	Out	Total	In	Out	Total
Person trips	410	285	695	174	411	585
Vehicle Driver	8	5	13	3	9	12
Vehicle Passenger	6	2	8	1	6	7
Pedal Cycle	25	33	58	20	28	48
Train	72	15	87	12	67	79
Underground	167	105	272	65	165	230
Bus	54	46	100	27	56	83
Motorcycle	8	6	14	3	9	12
Taxi or Minicab	5	7	12	4	6	10
Walk	61	61	122	35	63	98
Other	3	5	8	3	4	7

7.148 The two-way peak hour traffic flows and net changes resulting from the above trips are shown in Figure 7.2, along with the resulting percentage change in flows on each link.

Embedded Mitigation

7.149 A total of 300 car parking spaces will be provided for the replacement foodstore. Whilst this exceeds standard maximum requirements set out in the London Plan, TfL have indicated that this will nevertheless be acceptable given that this is a significant reduction from the current provision of 425 spaces. There will also be 912 residential long-stay cycle parking spaces, plus 73 long-stay cycle spaces for the other uses at the MS parcel and 46 at the PFS parcel. There will also be 64 short-stay/visitor cycle spaces at the MS parcel and 16 at the PFS parcel.

7.150 The following details provide a summary of inherent mitigation measures that would be included as part of the completed development:

- Zebra crossings on Juniper Crescent;
- Pedestrian refuge crossing on Chalk Farm Road (west);
- New bus laybys on either side of Juniper Crescent to replace the existing bus terminus at Morrisons;
- Reconfiguration of the Chalk Farm Road/Juniper Crescent signal junction to provide a single all movements junction;
- Travel Plans for the residential and commercial elements of the proposed development to minimise the reliance on single-occupancy car trips and promote non-car travel; and
- Delivery and Servicing Management Plan.

Severance

7.151 The severance effects within the identified study area for the completed development are shown in Table 7.8. Chalk Farm Road (west) has not been assessed because the increase in flows would be below 10%.

Table 7.8: Completed Development Severance Effects

Link	Sensitivity	Max. % change in total flows (peak hour)	Magnitude of Impact	Significance of Effect
Juniper Crescent	High	11.98%	Small	Moderate Adverse

7.152 The above assessment suggest that the proposed development would result in moderate adverse effects on Juniper Crescent. However, in qualitative terms these effects would be less pronounced, when taking into account the provision of the new crossings on this link. On balance, and based on professional judgement, it is considered that the overall effect would be **Minor Adverse**.

Driver Delay

7.153 A qualitative review of the LinSig modelling results for the Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction in the TA has been undertaken to determine the impacts on driver delays. Table 7.9 shows the average delays (seconds per PCU) at the existing Chalk Farm Road/Ferdinand Street/Juniper Crescent junction and at the proposed junction that would be delivered as part of the proposed development. These delays are based on the evening peak hour assessment, where queues and delays are highest.

Table 7.9: Completed Development Driver Delay Effects

Arm	Existing delay (s/PCU)	Proposed delay (s/PCU)	Change
Chalk Farm Road (east)	36.2	64.0	+28.2
Chalk Farm Road (west)	13.9	23.2	+9.3
Ferdinand Street	53.0	45.7	-7.3
Juniper Crescent	45.1	96.6	+51.5

7.154 The above results confirm that the proposed reconfiguration of the signal junction would increase average driver delays on Chalk Farm Road by up to 28 seconds, with a small reduction in delays on Ferdinand Street. These results do not reflect that fact that the proposals would remove an existing junction from Chalk Farm Road (existing egress), and so whilst there would be some minor increased delays at the signals this would be offset by the loss of queues and delays from an existing signalised arrangement. On balance, it is therefore considered that there would be a **Minor Adverse** effect on delays on Chalk Farm Road, which would be long-term and direct.

7.155 The above table also shows a marked increase in average delays for vehicles departing Juniper Crescent, increasing by 51.5 seconds. This is due to this traffic emerging from the new 'all movements' junction that requires greentime to be allocated to other movements. However, this increase needs to be considered in the context of the overall route taken by vehicles, where trips to Chalk Farm Road (east) would follow a shorter overall route, offsetting the increase in delays at the junction. Furthermore, these delays would be partly to allow better provision for cyclists at the junction. With this in mind, the effect on delays from Juniper Crescent is considered to be **Minor Adverse**.

7.156 Aside from changes in driver delay at the traffic signals, the only other potential change in delays to traffic within the study area would be along Juniper Crescent, owing to the presence of an additional Zebra crossing along this route and the relocated bus stops. Whilst no detailed modelling of these effects is included in the TA, it is considered that changes would be **Negligible**, given that drivers already have to pass the existing bus stops, and another Zebra crossing within the existing supermarket layout that would be removed. Overall, these features should therefore not affect driver delay to any significant degree.

Pedestrian Delay

7.157 For pedestrians crossing at uncontrolled points, traffic flows on all links are below the 1,400 movements threshold set out in the IEMA guidance, meaning that delays should be below 10 seconds and therefore insignificant (i.e. neutral).

7.158 In terms of controlled crossings, the use of the Zebra crossings on Juniper Crescent would give priority to pedestrians, therefore ensuring pedestrian delay is minimised. At the Chalk Farm Road signals, the maximum cycletime at the junction will increase to 96 seconds, which is an increase of 21 seconds compared with the current average 75 seconds cycletime at the junction. This additional delay is considered to be a **Minor Adverse** effect, especially given that delays at the existing egress junction would be reduced owing to the removal of this junction.

7.159 The route for pedestrians travelling between Juniper Crescent and Oval Road would be a similar distance in the proposed development scenario compared with the existing available routes. However, due to the re-grading of the application site, this route would include additional steps/ramps (or lifts). On balance it is considered that there would be a **Minor Adverse** effect on delays to these pedestrian trips.

Fear and Intimidation

7.160 The fear and intimidation effects on pedestrians for the completed development are summarised in Table 7.10 and Table 7.11. Chalk Farm Road (west) has not been assessed because the increase in flows would be below 10 %.

Table 7.10: Completed Development Fear and Intimidation Hazard Level

Link	Baseline				Completed Development			
	18-hr av. hourly flow	18-hr total HGV flow	Av. Speed	Overall Hazard Level	18-hr av. hourly flow	18-hr total HGV flow	Av. Speed	Overall Hazard Level
Juniper Crescent	151 (slight)	203 (slight)	15-20mph (great)	Moderate	166 (slight)	225 (slight)	15-20mph (great)	Moderate

Table 7.11: Completed Development Fear and Intimidation Effects

Link	Sensitivity	Baseline Hazard Level	CD Hazard Level	Magnitude of Impact	Significance of Effect
Juniper Crescent	High	Moderate	Moderate	No Impact	No Effects

7.161 Based on the above tables it is apparent that the changes to traffic flows arising from the proposed development are not sufficient enough to cause any notable changes to the fear and intimidation effects of traffic as experienced by local pedestrians. Notwithstanding this, it should also be noted that the proposed development would provide a better overall pedestrian environment that should reduce fear and intimidation, and so overall the effect is considered to be **Minor Beneficial**.

Pedestrian Amenity

7.162 The IEMA guidelines indicate that there could be impacts on pedestrian amenity where traffic flows are more than doubled or halved. The two-way flow data at Figure 7.2 confirms that this would not be the case during the completed development stage, and so the effects would be **Negligible**.

Accidents and Safety

7.163 Based on the methodology set out earlier in this chapter, Table 7.12 sets out the effects of the completed development traffic increases on accidents and safety at each of the five accident clusters reviewed in the TA. Morning peak hour flows are used to define the percentage changes, as these are the most pronounced increases.

Table 7.12: Completed Development Accidents at Safety Effects

Location	No. of accidents	Sensitivity	% flow change (peak hour)	Magnitude of impact	Significance of effect
Chalk Farm Road/ Belmont Street junction	9	Low	2.16%	Negligible (+0 accidents)	Negligible
Chalk Farm Road/ Ferdinand Street/Juniper Crescent signals	14	Medium	1.76%	Negligible (+0 accidents)	Negligible
Chalk Farm Road/ Harmood Street junction	5	Low	1.76%	Negligible (+0 accidents)	Negligible
Chalk Farm Road/ Hartland Road junction	8	Low	1.76%	Negligible (+0 accidents)	Negligible
Chalk Farm Road/Hawley Street junction	5	Low	1.76%	Negligible (+0 accidents)	Negligible

7.164 Table 7.11 confirms that the effects of the proposed development on the risks of PIA would be **Negligible**, owing to the low increase in peak hour movements.

7.165 With respect to the Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction, this would also be reconfigured as part of the proposals, and the new layout will be subject to standard Road Safety Audit processes, to ensure there would be **No** adverse effects on safety.

Driver Stress

7.166 Following completion of the proposed development, drivers will already be familiar with the new signal-controlled arrangement at Chalk Farm Road and the reconfiguration of Juniper Crescent. As such, uncertainty on these issues would have reduced to a **Negligible** level by this stage.

7.167 The new roundabout and ramped access to the supermarket car park would be a new aspect of the road network for drivers to become familiar with; however this is considered unlikely to have any significant effects on driver stress. The magnitude of impact is considered to be low, and as such the effect would be **Negligible**.

Highway Network Capacity

7.168 The net traffic flow changes in Figure 7.2 confirm that there would be no significant increases in traffic flow above 10% during peak hours or across the day on Chalk Farm Road or Ferdinand Street. The most notable change would be a 11.98% increase in flows on Juniper Crescent during the morning peak hour. However, this equates to a total of 271 two-way vehicle movements using this road, or an average of 4 to 5 vehicles per minute, which is not anticipated to result in any significant delays. The significance of the effect on this link is therefore considered to be **Negligible**.

7.169 The LinSig modelling results for the reconfigured Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction show increased delays for motor vehicle traffic (see Table 7.9 above). However, this is due to the reconfigured junction incorporating new cycle-only phases at Ferdinand Street and Juniper Crescent, thereby improving conditions for cyclists. As a result, the overall resulting significance of effect would be **Negligible** when taking into account the marked improvements for cyclists.

7.170 As per LBC's comments in the Scoping Opinion, consideration has also been given to the potential impacts on Gilbey's Road and Oval Road. These roads do not provide any link into the application site for vehicular traffic; however the existing pedestrian/cyclist link at this location would be retained. This presents the possibility of some taxi trips associated with the proposed development occurring from this direction, especially for trips to the south. However, the proposed development is only predicted to generate up to 12 peak hour taxi trips, and given the nature of taxi trips the waiting times of these vehicles at this location would be minimal. Given that these roads fall outside of the Applicant's control, there are no specific measures that can be implemented to prevent taxis using this road (as they already do). However, the flows are sufficiently low to conclude that the effects would be **Negligible**.

Public Transport Capacity

7.171 Table 7.7 confirms that the proposals would generate up to 459 additional peak hour public transport passenger trips, comprising 100 bus passengers, 272 underground passengers, and 87 train passengers. TfL have indicated that this predicted demand will be assessed against service capacities once the planning application is submitted. However, in the meantime the following details provide a qualitative assessment of the potential effects of these increases.

7.172 With respect to 100 additional bus passenger trips during the peak hour, there are currently 14 services per hour stopping at the MS parcel (routes 27 and 393). If all passengers were to use these two services that stop at the application site, this would equate to an average of seven passengers per bus.

7.173 As for underground services, there are 22 services each way on the northern line during the morning peak hour, or 44 in total. Based on 272 additional underground passengers, this equates to a modest average increase of six passengers per service.

7.174 Finally, with respect to trains, if all passengers were to use Kentish Town West there are eight services each way during the morning peak hour, resulting in an average of five additional passengers per service.

7.175 It is considered that the above increases are unlikely to result in significant capacity issues on the current public transport services, given that TfL have not yet advised of any significant capacity issues, and so this would be a **Minor Adverse** effect.

Mitigation and Residual Effects

Demolition and Construction

7.176 Table 7.11 identifies one significant adverse effect resulting from demolition and construction traffic that warrants mitigation (moderate adverse effect on driver stress). Aside from this, no additional mitigation is required and therefore the residual demolition and construction effects remain as reported in the potential impacts and likely effects section, with key mitigation measures implemented during demolition and/or construction works as part of a CTMP.

7.177 Additional mitigation proposed in respect of driver stress would comprise new signage to make the new road layout clear for road users, as well as communication of the new layout in-store on noticeboard. Taking this into account the residual effect would reduce from moderate adverse to **Minor Adverse**.

Completed Development

7.178 Aside from the embedded mitigation already listed, no additional mitigation is required for the completed development as no significant adverse effects (e.g. moderate or major) have been identified. Hence, the residual demolition and construction effects remain as reported in the potential impact and likely effects section.

7.179 The additional mitigation measures are summarised in Table 7.13, whilst Table 7.14 confirms the residual effects and their significance.

Table 7.13: Summary of Proposed Mitigation and Enhancement Measures

Likely Effects Identified	Proposed Mitigation / Enhancement Measures
Demolition and Construction	
Change in Severance	No Mitigation Required
Change in Driver Delay	No Mitigation Required
Change in Pedestrian Delay	No Mitigation Required
Change in Fear and Intimidation	No Mitigation Required
Change in Pedestrian Amenity	No Mitigation Required
Change in Accidents and Safety	No Mitigation Required
Change in driver stress	Provide suitable signage for motorists on approach to site confirming new road layout, and ensure future changes are communicated to customers in store (e.g. on noticeboards) – to be secured by suitable S106 contributions.
Change in Highway Capacity	No Mitigation Required
Change in Public Transport Capacity	No Mitigation Required
Completed Development	
Change in Severance	No Mitigation Required
Change in Driver Delay	No Mitigation Required
Change in Pedestrian Delay	No Mitigation Required
Change in Fear and Intimidation	No Mitigation Required
Change in Pedestrian Amenity	No Mitigation Required
Change in Accidents and Safety	No Mitigation Required
Change in driver stress	No Mitigation Required
Change in Highway Capacity	No Mitigation Required
Change in Public Transport Capacity	No Mitigation Required

Table 7.14: Summary of Residual Effects

Receptor	Description of Residual Effect	Nature of Residual Effect*					
		Significance**	+ -	D I	P T	R IR	St Mt Lt
Demolition and Construction							
Juniper Crescent, Chalk Farm Road (west)	Change in Severance	Minor	-	D	T	R	Mt
Drivers on Chalk Farm Road (east), Chalk Farm Road (west), Ferdinand Street and Juniper Crescent	Change in Driver Delay	Negligible	N/A	D	T	R	Mt
Pedestrians along Chalk Farm Road (east), Chalk Farm Road (west), Ferdinand Street and Juniper Crescent	Change in Pedestrian Delay	Negligible	N/A	D	T	R	Mt
Juniper Crescent, Chalk Farm Road (west)	Change in Fear and Intimidation	Negligible	N/A	D	T	R	Mt
Juniper Crescent, Chalk Farm Road (west)	Change in Pedestrian Amenity	Negligible	N/A	D	T	R	Mt
Chalk Farm Road (east and west)	Change in Accidents and Safety	Negligible	N/A	D	T	R	Mt
Juniper Crescent, Chalk Farm Road (west)	Change in driver stress	Minor	-	D	T	R	Mt
Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction	Change in Highway Capacity	Negligible	N/A	D	T	R	Mt
Bus stops at site and Chalk Farm Road, Chalk Farm and Camden Town Underground Stations, Kentish Town West Railway Station	Change in Public Transport Capacity	Negligible	N/A	D	T	R	Mt

Table 7.14: Summary of Residual Effects

Receptor	Description of Residual Effect	Nature of Residual Effect*					
		Significance**	+ -	D I	P T	R IR	St Mt Lt
Completed Development							
Juniper Crescent	Change in Severance	Minor	-	D	P	R	Lt
Drivers on Chalk Farm Road (east), Chalk Farm Road (west), Ferdinand Street and Juniper Crescent	Change in Driver Delay	Minor	-	D	P	R	Lt
Pedestrians along Chalk Farm Road (east), Chalk Farm Road (west), Ferdinand Street and Juniper Crescent	Change in Pedestrian Delay	Minor	-	D	P	R	Lt
Juniper Crescent,	Change in Fear and Intimidation	Minor	+	D	P	R	Lt
Juniper Crescent,	Change in Pedestrian Amenity	Negligible	N/A	D	P	R	Lt
Chalk Farm Road (east and west)	Change in Accidents and Safety	Negligible	N/A	D	P	R	Lt
Juniper Crescent,	Change in driver stress	Negligible	N/A	D	P	R	Lt
Chalk Farm Road/Ferdinand Street/Juniper Crescent signal junction	Change in Highway Capacity	Negligible	N/A	D	P	R	Lt
Bus stops at site and Chalk Farm Road, Chalk Farm and Camden Town Underground Stations, Kentish Town West Railway Station	Change in Public Transport Capacity	Minor	-	D	P	R	Lt

Notes:
* - = Adverse/ + = Beneficial; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St- Short term/ Mt –Medium term/ Lt –Long term.
**Negligible/Minor/Moderate/Major

Likely Significant Environmental Effects

7.180 The assessment confirms that, following inherent and additional mitigation, there would be no moderate or major adverse effects, and so there are considered to be no significant effects.

Cumulative Effects

7.181 The TA includes a review of the nearby cumulative developments, and has concluded that no allowance for any traffic movements associated with these schemes is required. This is on the basis that most of these schemes are car-free, and whilst there are some with minor net traffic increases, there are also schemes resulting in net reductions in traffic, and on balance any changes to flows near the application site would be negligible. With respect to construction traffic, the application details presented for each cumulative development have been reviewed to confirm where additional construction traffic movements along Chalk Farm Road would need to be taken into account. Available details for these applications have been used to identify the following daily increases in two-way HGV trips, which are reflected in the cumulative flows in Figure 7.2 for the demolition and construction phase (noting that construction for the cumulative sites should have completed prior to the completed development), and summarised below.

- Application Ref 2015/4562/P – 16
- Application Ref 2015/4774/P – 36
- Application Ref 2016/6891/P - 6

7.182 This section also takes into account the cumulative effects resulting from traffic associated with the upcoming HS2 construction works. The Juniper Crescent HS2 compound will be located to the south-west of the application site, and access via either Juniper Crescent or Regent's Park Road, whilst this will also be the base for vehicle trips to the nearby Chalk Farm Road satellite compound to the east.

7.183 The TA includes details of potential daily vehicle movements associated with HS2, and these are summarised in Figure 7.2. These flows are derived from the EIA for HS2, which was produced prior to the removal of the potential HS2-HS2 link from the proposals. It is envisaged that this could affect predicted vehicle trips associated with HS2, but no specific details are yet available, and so in the meantime the previous EIA flows have been adopted for the purposes of this assessment. This approach has been confirmed to LBC prior to submission of the application.

7.184 The cumulative effects of the HS2 traffic has been considered at both the demolition and construction stage and the completed development stage, as the HS2 traffic could overlap with both stages of the proposed development. Whilst the HS2 EIA suggests the programme finishing in 2023, it is understood to have slipped as use of this compound should have started by the second quarter of 2017 according to the HS2 Environmental Statement, but has not, and so it is assumed for robustness that this could overlap with the 2024 Opening Year.

7.185 A review of the tables within Figure 7.1confirms that only daily flows would be affected by HS2, on the assumption that construction-related traffic would not be permitted during peak hours. Based on these figures, the study area for the demolition and construction stage remains as per the main assessment (i.e. Juniper Crescent and Chalk Farm Road (west)), whilst for the completed development the study area also remains the same (Juniper Crescent).

7.186 The only notable change is an increase in daily HGV flows over 10% on Chalk Farm Road (east), with increases of 16.18% at demolition and construction and 16.08% at completed development. However, this is below the 30% 'Rule 1' IEMA thresholds, and the lower 10% 'Rule 2' threshold is not considered necessary as this route is well-used by HGVs and so not sensitive in this respect.

7.187 The following assessment of cumulative effects focusses on the effects on severance, fear and intimidation, and accidents and safety. With respect to the other topics, it is considered that the cumulative impacts need not be re-assessed for the following reasons:

- Driver Delay – capacity modelling focusses on quantifying delays during peak hours, during which time it is assumed that there will be restrictions on HS2 construction traffic. Outside of these peaks the additional traffic is unlikely to result in any significant delays as background traffic levels are lower.
- Pedestrian Delay – as above, delays at the signal-controlled crossings at Chalk Farm Road are based on peak hour conditions, during which it is assumed HS2 will not have an impact as hours for construction traffic will be outside of the peak periods.
- Pedestrian Amenity – with HS2 traffic in place, the total flows shown in Figure 7.1 would not double or halve, and so no assessment is deemed necessary.
- Driver Stress – the additional HS2 trips are unlikely to affect the level of driver uncertainty already considered above, and so no further assessment is considered necessary.

- Highway capacity – given that it is assumed HS2 traffic would occur outside of network peak periods, not assessment of the cumulative impacts on capacity is deemed necessary.
- Public Transport Capacity – the compound is assumed not to generate any significant demand for additional public transport trips.

Demolition and Construction

Severance

7.188 With reference to the methodology set out earlier in this chapter, the cumulative severance effects within the identified study area during demolition and construction are shown in Table 7.15.

Table 7.15: Demolition and Construction Cumulative Severance Effects

Link	Sensitivity	Max. %age change in HGV flows (daily)	Magnitude of Impact	Significance of Effect
Juniper Crescent	High	140.59%	High	Major Adverse
Chalk Farm Road (west)	High	51.31%	Small	Moderate Adverse

7.189 The above table shows moderate to major adverse impacts on severance, owing to the significant uplift in HGV traffic during the busy period of HS2 construction. However, these movements would be rigorously managed by measures set out in the CTMP for HS2, and overall daily movements on these links would be reduced, and as such the cumulative residual severance effects are considered to be **Minor Adverse** and so not significant.

Fear and Intimidation

7.190 The cumulative fear and intimidation effects on pedestrians during demolition and construction are summarised in Table 7.16 and Table 7.17.

Table 7.16: Demolition and Construction Cumulative Fear and Intimidation Hazard Level

Link	Baseline				Demolition and Construction			
	18-hr av. hourly flow	18-hr total HGV flow	Av. Speed	Overall Hazard Level	18-hr av. hourly flow	18-hr total HGV flow	Av. Speed	Overall Hazard Level
Juniper Crescent	151 (slight)	203 (slight)	15-20mph (great)	Moderate	70 (slight)	584 (slight)	15-20mph (great)	Moderate
Chalk Farm Road (west)	416 (slight)	515 (slight)	15-20mph (great)	Moderate	417 (slight)	857 (slight)	15-20mph (great)	Moderate

Table 7.17: Demolition and Construction Cumulative Fear and Intimidation Effects

Link	Sensitivity	Baseline Hazard Level	D+C Hazard Level	Magnitude of Impact	Significance of Effect
Juniper Crescent	High	Moderate	Moderate	No Impact	No effect
Chalk Farm Road (west)	High	Moderate	Moderate	No impact	No effect

7.191 The above table confirms that there would be **No** cumulative fear and intimidation effects, when taking into account the HS2 flows.

Accidents and Safety

7.192 Given that even with HS2 traffic in place there would be a net reduction in total traffic movements on the local highway network during demolition and construction, the environmental effects on road safety have been considered in the context of the completed development only.

Completed Development

Severance

7.193 The cumulative severance effects within the identified study area are shown in Table 7.18.

Table 7.18: Completed Development Cumulative Severance Effects

Link	Sensitivity	Max. %age change in HGV flows (daily)	Magnitude of Impact	Significance of Effect
Juniper Crescent	High	85.61%	Medium	Major Adverse

7.194 The above details confirm that there would be major adverse severance on Juniper Crescent due to the additional cumulative HS2 movements. However, when taking into account the mitigation offered by the Zebra crossings on this route, as well as the fact that HS2 traffic would be appropriately managed, it is considered that the residual cumulative severance effect would be **Minor Adverse**.

Fear and Intimidation

7.195 The cumulative fear and intimidation effects on pedestrians for the completed development are summarised in Table 7.19 and Table 7.20.

Table 7.19: Completed Development Cumulative Fear and Intimidation Hazard Level

Link	Baseline				Completed Development			
	18-hr av. hourly flow	18-hr total HGV flow	Av. Speed	Overall Hazard Level	18-hr av. hourly flow	18-hr total HGV flow	Av. Speed	Overall Hazard Level
Juniper Crescent	151 (slight)	203 (slight)	15-20mph (great)	Moderate	189 (slight)	435 (slight)	15-20mph (great)	Moderate

Table 7.20: Completed Development Cumulative Fear and Intimidation Effects

Link	Sensitivity	Baseline Hazard Level	CD Hazard Level	Magnitude of Impact	Significance of Effect
Juniper Crescent	High	Moderate	Moderate	No impact	No Effect

7.196 Above table confirms that there would be **No** cumulative fear and intimidation effects, when taking into account the HS2 flows.

Accidents and Safety

7.197 Based on the methodology set out earlier in this chapter, Table 7.21 sets out the cumulative effects of the completed development traffic and HS2 traffic on accidents and safety at each of the five accident clusters reviewed in the TA. Table 7.21 uses the daily increase in flows as these are the most pronounced in percentage terms when HS2 traffic is included.

Table 7.21: Completed Development Cumulative Accidents at Safety Effects

Location	No. of accidents	Sensitivity	% flow change (daily)	Magnitude of impact	Significance of effect
Chalk Farm Road/Belmont Street junction	9	Low	3.74%	Neutral (+0 accidents)	Negligible
Chalk Farm Road/ Ferdinand Street/Juniper Crescent signals	14	Medium	4.31%	Neutral (+0 accidents)	Negligible
Chalk Farm Road/ Harmood Street junction	5	Low	4.31%	Neutral (+0 accidents)	Negligible
Chalk Farm Road/Hartland Road junction	8	Low	4.31%	Neutral (+0 accidents)	Negligible
Chalk Farm Road/Hawley Street junction	5	Low	4.31%	Neutral (+0 accidents)	Negligible

7.198 The above table confirms that the cumulative risks of PIA would still be **Negligible** even when taking into account HS2 flows.

7.199 Overall, this section confirms that there would be no new significant effects (e.g. moderate or major) when taking cumulative developments into account.

Summary

7.200 This chapter considers the transport-related environmental impacts and effects resulting from the proposed development. It considers effects on sensitive receptors during both the demolition and construction stage and for the completed development. It follows best practice methodologies, primarily those set out in the IEMA guidelines, and also applies professional judgement where specific calculations and criteria cannot be applied.

7.201 The assessment has used baseline condition information drawn from several sources including site visits, traffic counts, Personal Injury Accident data, and a review of online materials such as cycle maps and public transport timetables.

7.202 Consideration has been given to the worst case demolition and construction stage, during which time a temporary supermarket and offices would be operational at the PFS parcel whilst the demolition and construction works are underway at the MS parcel.

7.203 In addition consideration has been given to the completed development stage with the supermarket re-instated and operational at the MS parcel along with residential and commercial floorspace, as well as the reinstated and operational PFS and office floorspace at the PFS parcel.

7.204 Traffic flows and person trip generation have been calculated to inform the findings of the assessments. The resulting percentage change in traffic flows at the future baseline for both development stages have been assessed. The following details summarise the key percentage increases that have been assessed on links within the identified study areas:

- Demolition and Construction stage
  - Juniper Crescent: +63.10% HGVs daily
  - Chalk Farm Road (east): +32.65% HGVs daily
- Completed Development stage
  - Juniper Crescent: +11.98% pcus AM peak hour

Demolition and Construction

7.205 When taking into account inherent mitigation, including the CTMP and upfront transport infrastructure including crossings and a new signal-controlled junction, the transport environmental effects during the demolition and construction stage would not be significant (i.e. no moderate to major adverse effects).

7.206 Implementation of the CTMP would manage the flow of HGV movements along Juniper Crescent to minimise the effects on crossing pedestrians. The proposed Zebra Crossings on this route would also be implemented at an early stage to limit severance.

7.207 The only moderate adverse effect during this phase would be on driver stress, which will be mitigated and reduced to minor adverse through appropriate signage to reduce uncertainty for motorists using the new layout, along with communications of the changes to Morrisons customers through media such as noticeboards.

Completed Development

7.208 When taking into account inherent mitigation that would be provided, the transport environmental impacts of the completed development would not be significant (i.e. no moderate or major adverse impacts). No additional mitigation beyond the measures already proposed as part of the development is therefore necessary.

7.209 There would be minor adverse effects on driver delay and pedestrian delay owing to the changes to the traffic signals at Chalk Farm Road. There would be increased peak hour delays of +28.2 seconds on Chalk Farm Road (east) and +51.5 seconds on Juniper Crescent, with up to 21 seconds additional waiting time for pedestrians. However, these effects would be minimised by provision of the Travel Plan and associated pedestrian improvements including crossings.

7.210 There would also be a minor adverse effect on public transport capacity; however the passenger increases are considered to be at a manageable level with 7 or less passengers per service, and it is considered that this should not warrant further mitigation.

8 AIR QUALITY

Introduction

8.1 This chapter of the ES considers the potential impacts and likely effects of the proposed development on air quality.

8.2 This assessment includes a review of existing air quality. It predicts and evaluates the potential impacts of the proposed development and the associated likely effects on air quality arising from the demolition and construction works, and from the occupation of the completed development.

8.3 Potential sources of emissions are identified and assessed in the context of existing air quality and emission sources and the nature and location of receptors. The assessment also includes the impact of future air quality across the proposed development.

8.4 The chapter provides a summary of relevant planning policy and a description of the methodology used in the assessment. This is followed by a description of the relevant baseline conditions of the application site and surrounding area and an assessment of the likely effects of the proposed development taking into account embedded mitigation. Additional mitigation measures are identified where appropriate to avoid, reduce or offset any significant adverse effects identified, and an overview provided of the nature and significance of residual effects.

8.5 In accordance with Policy 7.14 of the London Plan an Air Quality Neutral Assessment has been undertaken in relation to the transport emissions and included within this Chapter. As agreed in consultations with Applicant's energy and sustainability consultants (BBS Environmental)[1], the Air Quality Neutral Assessment for the building emissions has been completed by BBS Environmental and is presented in Appendix D of the Sustainable Design and Construction Assessment which accompanies the application.

Legislation and Policy Context

International Legislation and Policy

European Union Ambient Air Quality and Clean Air for Europe, 2008

8.6 Directive 2008/50/EC[2] of the European Parliament came into force on 11 June 2008. The directive includes the following elements:

- The merging of most of existing legislation (Framework Directive 96/62/EC, 1-3 daughter Directives 1999/30/EC, 2000/69/EC, 2002/3/EC, and Decision on Exchange of Information 97/101/EC) into a single directive (except for the fourth daughter directive) with no change to existing air quality objectives;
- New air quality objectives for $PM_{2.5}$ (fine particles) including the limit value and exposure related objectives - exposure concentration obligation and exposure reduction target;
- The possibility to discount natural sources of pollution when assessing compliance against limit values; and
- The possibility for time extensions of three years (PM_{10}) or up to five years (NO_2, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

8.7 The Directive contains a series of limit values for the protection of human health and critical levels for the protection of vegetation.

8.8 Compliance with the European Union (EU) Limit Values is mandatory. However, Member States can apply for a time extension for compliance, subject to approval of an action plan by the European Commission. The UK Government applied in autumn 2011 for a time extension for compliance with the NO_2 limit values until 2015 for a number of areas throughout England. However, the UK Government has withdrawn its application for those zones where compliance is not expected until after 2015, which includes central London.

8.9 In December 2015, the Department for Environment Food and Rural Affairs (Defra) on behalf of the UK Government produced plans to improve air quality in the UK in order to meet the EU targets in the shortest possible time. An overview document has been produced[3], together with detailed plans for 31 zones where air quality is not predicted to meet the objective in 2013. The plan for the Greater London Urban Area[4] sets out a range of measures to reduce NO_2 concentrations and indicates that with these measures air quality in the area will be compliant by 2025. The adequacy of these plans to bring about the necessary improvements in air quality to meet the relevant objectives within the shortest time possible has recently been successfully challenged within the High Court. As a result Defra has published a new draft plan for consultation[5]. The plan focuses on reducing emissions from road traffic vehicles through such measures as the introduction of low emission zones.

National Legislation and Policy

Environment Act, 1995

8.10 The Environment Act 1995[6] requires the UK Government and the devolved administrations to produce a national air quality strategy containing standards, objectives and measures for improving ambient air quality and to keep these policies under review.

8.11 The UK Government and the devolved administrations published the latest Air Quality Strategy for England, Scotland, Wales and Northern Ireland on 17 July 2007[7]. The Strategy provides an over-arching strategic framework for air quality management in the UK by way of the following:

- Setting out a way forward for work and planning on air quality issues;
- Setting out the air quality standards and objectives to be achieved;
- Introducing a new policy framework for tackling fine particles; and
- Identifying potential new national policy measures which modelling indicates could give further health benefits and move closer towards meeting the Strategy's objectives.

8.12 With regard to this assessment, the Air Quality Strategy contains national air quality standards and objectives established by the Government to protect human health. The objectives for nitrogen dioxide and particulates (PM_{10} and $PM_{2.5}$) have been set, along with seven other pollutants (benzene, 1,3 - butadiene, carbon monoxide, lead, PAHs, sulphur dioxide and ozone). Those which are limit values required by EU Daughter Directives on Air Quality have been transposed into UK law through the Air

[1] Ken Thomas, Associate Director, May 2017
[3] Defra, December 2015. Improving air quality in the UK, Tackling nitrogen dioxide in our towns and cities, UK overview document. Defra.
[3] Defra, December 2015. Improving air quality in the UK, Tackling nitrogen dioxide in our towns and cities, UK overview document. Defra.
[4] Defra, December 2015. Air Quality Plan for the achievement of EU air quality limit value for nitrogen dioxide (NO_2) in Greater London urban area (UK0001). Defra.
[5] Defra, 2017. Improving air quality in the UK: tackling nitrogen dioxide in our towns and cities Draft UK Air Quality Plan for tackling nitrogen dioxide. Defra.
[6] Environment Act, 1995, The Stationery Office Limited.
[7] Department for Environment, Food and Rural Affairs, 2007. Air Quality Strategy for England, Scotland, Wales and Northern Ireland. HMSO.

Quality Standards Regulations 2010 which came into force on 11th June 2010. Table 8.1 provides the UK Air Quality Objectives for NO_2, PM_{10} and $PM_{2.5}$.

Table 8.1: UK Air Quality Objectives for Nitrogen Dioxide and Particulate Matter

Pollutant	Objective	Concentration measured as
Particles (PM_{10})	50µg/m^3 not to be exceeded more than 35 times a year	24 hour mean
	40µg/m^3	Annual mean
Particles ($PM_{2.5}$)	25µg/m^3 (except Scotland)	Annual Mean
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1 hour mean
	40µg/m^3	Annual mean

8.13 Objectives for $PM_{2.5}$ were also introduced by the UK Government and the Devolved Administrations in 2010. However, the Air Quality Strategy has adopted an 'exposure reduction' approach for $PM_{2.5}$ in order to seek a more efficient way of achieving further reductions in the health effects of air pollution by providing a driver to improve air quality everywhere in the UK rather than just in a small number of localised hotspot areas. As such, no further consideration has been given to $PM_{2.5}$ within this assessment.

National Planning Policy Framework, 2012

8.14 On a national level, air quality can be a material consideration in planning decisions. The NPPF for England[8], released on 27 March 2012, is considered a key part of the Governments reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. The NPPF replaces the Planning Policy Statement 23 (PPS23) Planning and Pollution Control[9].

8.15 The NPPF states that the *"planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability"*.

8.16 It goes on to state that *"planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan"*.

Planning Practice Guidance

8.17 The NPPF is supported by a series of PPG[10]. The PPG in relation to air quality provides guiding principles on how planning can take account of the impact of new development on air quality.

8.18 The PPG sets out the information that may be required in an air quality assessment, making clear that "*…assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality*." It also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that "*…mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact."*

[8] Department for Communities and Local Government, 2012.National Planning Policy Framework, London. HMSO.
[9] Office of the Deputy Prime Minister, 2004. Planning Policy Statement 23: Planning and Pollution Control.
[10] http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality/

Regional Policy

The London Plan Spatial Development Strategy for London Consolidated with Alterations since 2011, 2016

8.19 In March 2016, the updated London Plan was published by the GLA[11]. The London Plan provides an overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20–25 years. The Plan brings together the geographic and locational aspects of the Mayor's other strategies, including a range of environmental issues such as climate change (adaptation and mitigation), air quality, noise and waste.

8.20 Policy '7.14 - Improving Air Quality' relates specifically to improving air quality and states the following:

8.21 *"The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimize public exposure to pollution"*.

8.22 It goes on to state the following with regards to planning decisions:

8.23 *"Development proposals should:*

a) minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3)

b) promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions from construction and demolition'

c) be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs))

d) ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches

e) where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified".

8.24 Policy '5.3 - Sustainable design and construction' states that development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process. Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance (SPG) and this should be clearly demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:

[11] Greater London Authority, 2016. The London Plan Spatial Development Strategy for Greater London consolidated with alterations since 2011. London. GLA.

- *"minimising carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems);*
- *avoiding internal overheating and contributing to the urban heat island effect;*
- *efficient use of natural resources (including water), including making the most of natural systems both within and around buildings; and*
- *minimising pollution (including noise, air and urban run-off)".*

London Local Air Quality Management, 2016

8.25 Air Quality in London is devolved to the Mayor of London, who has a supervisory role, with powers to intervene and direct local authorities in Greater London under Part IV of the Environment Act 1995. In support of these devolved powers, the Mayor has established a London-specific LAQM system (LLAQM)[12] for the effective and coordinated discharge of their respective responsibilities under Part IV of the Act.

8.26 At the core of LLAQM delivery are three pollutant objectives; these are: nitrogen dioxide (NO_2), particulate matter (PM_{10}) and sulphur dioxide (SO_2). All current Air Quality Management Areas (AQMAs) across the UK are declared for one or more of these pollutants, with NO_2 accounting for the majority. In Greater London, AQMAs are declared for NO_2 and PM_{10} in equal proportions. It is a statutory requirement for local authorities to regularly review and assess air quality in their area and take action to improve air quality when objectives set out in regulation cannot be met.

8.27 The LBC has declared an AQMA that covers the entire administrative area for exceedances of the annual NO_2 objective and 24 hour PM_{10} objective, with the main source considered road transport.

8.28 In response to the AQMA declaration, the LBC has prepared an Air Quality Action Plan (AQAP), which was first published in 2016[13]. Actions to improve air quality across the LBC include the following:

- Monitor and report air quality across the borough;
- Implement air quality control measures through local planning policy;
- Impose a 20 mph speed limit across the borough (baring TfL roads); and
- Implement measures to encourage and enable active and alternative travel options.

The Mayor's Air Quality Strategy 'Clearing the Air', 2010

8.29 The Mayor of London has set out a detailed air quality strategy[14] for Greater London in order to deliver the required reductions in PM_{10} and NO_2 concentrations to meet the EU limits. The policies and measures within the strategy are divided into transport and non-transport measures. With regard to the proposed development the key policies are as follows:

- Policy '6 - Reducing emissions from construction and demolition sites' which states that the Mayor will work with the London Council to review and update the Best Practice guidance for construction and demolition sites and create SPG to assist implementation;
- Policy '7 - Using the planning process to improve air quality' which states that new developments in London shall as a minimum be 'Air Quality Neutral' and that the Mayor will encourage boroughs to require emissions assessments to be carried out alongside conventional air quality assessments. Where air quality impacts are predicted to arise from developments these will have to be offset by developer contributions and mitigation measures secured through planning conditions, section 106 agreements or the Community Infrastructure Levy;
- Policy '8 - Maximising the air quality benefits of low to zero carbon energy supply' which states that the Mayor will apply emission limits for both PM and oxides of Nitrogen (NOx) for new biomass boilers and NOx emission limits for Combined Heat and Power plant (CHP). Air quality assessments will be required for all developments proposing biomass boilers or CHPs and operators will be required to provide evidence yearly to demonstrate compliance with the emission limits; and
- Policy '9 - Energy efficient buildings' which states that the Mayor will set CO_2 reduction targets for new developments which will be achieved using the Mayor's Energy Hierarchy. These measures will result in reductions of NOx emissions.

Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance, 2014

8.30 This SPG[15] seeks to reduce emissions of dust and PM_{10} from construction and demolition activities in London. It also aims to manage emissions of nitrogen oxides (NOx) from construction and demolition machinery. The SPG:

- Provides more detailed guidance on the implementation of all relevant policies in the London Plan and the Mayor's Air Quality Strategy to neighbourhoods, boroughs, developers, architects, consultants and any other parties involved in any aspect of the demolition and construction process;
- Sets out the methodology for assessing the air quality impacts of construction and demolition in London; and
- Identifies good practice for mitigating and managing air quality impacts that is relevant and achievable, with the overarching aim of protecting public health and the environment.

8.31 The principles of the SPG apply to all developments in London as their associated construction and demolition activity may all contribute to poor air quality unless properly managed and mitigated.

Sustainable Design and Construction Supplementary Planning Guidance, 2014

8.32 This SPG[16] aims to support developers, local planning authorities and neighbourhoods to achieve sustainable development. It provides guidance on to how to achieve the London Plan objectives effectively, supporting the Mayor's aims for growth, including the delivery of housing and infrastructure.

8.33 In relation to air quality the SPG provides guidance on the following key areas:

- assessment requirements;
- construction and demolition;
- design and occupation;
- air quality neutral policy for buildings and transport; and
- emissions standards for combustion plant.

8.34 The principles of the SPG apply to all developments in London as their associated construction and demolition activity may all contribute to poor air quality unless properly managed and mitigated.

Local Policy

London Borough of Camden Core Strategy and Development Policies Document 2010-2025, 2010

8.35 The current Local Development Framework for LBC covers the period 2010 to 2025, and comprises the Core Strategy[17] and Development Policies[18] documents, which were both adopted by LBC in 2010. These documents set out LBC's vision for the future of the borough, including a variety of policies to guide new development.

[12] Greater London Authority, 2016.London Local Air Quality Management (LLAQM), Technical Guidance 2016 (LLAQM.TG (16))
[13] London Borough of Camden, 2016. Camden's Clean Air Action Plan 2016-2018. LBC.
[14] Greater London Authority, 2010. Clearing the Air - The Mayors London Air Quality Strategy. London. GLA.
[15] Greater London Authority, 2014. The Control of Dust and Emissions During Construction and Demolition, Supplementary Planning Guidance. London GLA.
[16] Greater London Authority, 2015.Sustainable Design and Construction Supplementary Planning Guidance. London. GLA.
[17] London Borough of Camden, 2010. Core Strategy 2010-2025.
[18] London Borough of Camden, 2010. Camden Development Policies 2010-2025.

8.36 The following Core Strategy policies are relevant to this assessment:

- CS9 - Achieving a successful Central London; and
- CS16 - Improving Camden's health and well-being.

8.37 The following Development policies are relevant to this assessment:

DP32 - Air quality and Camden's Clear Zone.

Camden Planning Guidance 6 – Amenity, 2016

8.38 The key messages within this SPG[19] in relation to air quality are that the Council expects new development to be 'air quality neutral' and not to lead to further deterioration of existing poor air quality. Furthermore development should include mitigation and offsetting measures to deal with any adverse air quality impacts associated with your development proposals. Development should be designed to minimise exposure of occupants to existing poor air quality.

London Borough of Camden Draft Local Plan, 2015

8.39 Policy 'CC4 - Air Quality' within the Council's draft Local Plan relates specifically to air quality and states the following:

8.40 *"The Council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of a development on air quality.*

8.41 *Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless mitigation measures are adopted to reduce the impact to acceptable levels. Similarly, developments in locations of poor air quality will not be acceptable unless designed to mitigate the impact to within acceptable limits. Consideration must be taken to the actions identified in the Council's Air Quality Action Plan.*

8.42 *Development which involves significant demolition, construction or earthworks will also be required to assess the risk of impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan.*

8.43 *The Council will only grant planning permission for development in Camden's Clear Zone region that significantly increases travel demand where it considers that appropriate measures to minimise the transport impact of development are incorporated"*.

Draft Camden Goods Yard Planning Framework, 2017

8.44 It is the LBC's intention that the planning framework for Camden Goods Yard[20] will be adopted as a Supplementary Planning Document (SPD). In relation to air quality it states that "*new development should minimise its impact on local air quality and meet the GLA's proposed Air Quality Positive standard (and prior to its implementation the GLA Air Quality Neutral standard)*".

Guidance

Environmental Protection UK/Institute of Air Quality Management Guidance, Land-Use Planning Guidance, 2017

8.45 In January 2017, Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) produced guidance to ensure that air quality is adequately considered in the land-use planning and development control processes[21].

8.46 The guidance document is particularly applicable to assessing the effect of changes in exposure of members of the public resulting from residential and mixed-use developments, especially those within urban areas where air quality is poorer. It is also relevant to other forms of development where a proposal could affect local air quality and for which no other guidance exists.

Institute of Air Quality Management: Construction Dust Guidance, 2016 v1.1

8.47 Construction activities can result in temporary effects from dust. 'Dust' is a generic term which usually refers to particulate matter in the size range 1-75 microns in diameter; the most common impacts from dust emissions are soiling and increased ambient PM_{10} concentrations.

8.48 The Institute of Air Quality Management (IAQM) Construction Dust Guidance provides guidance to consultants and Environmental Health Officers (EHOs) on how to assess air quality effects from construction-related activities. The Construction Dust Guidance provides a method for classifying the likely scale of construction activities based on 'dust emission classes' (small, medium or large), and defining the risk of dust impacts due to the proximity of the site to the closest sensitive receptor and background PM_{10} concentrations in the area. Although the guidance provides criteria for the classification of dust classes, understanding that each site will be unique and a purely prescriptive approach to risk assessment would not be appropriate, the importance of professional judgement is noted throughout the Construction Dust Guidance. The guidance recommends that once the risk of dust impacts are identified appropriate mitigation measures are recommended and included within the Construction Environmental Management Plan (CEMP). The Construction Dust Guidance methodology is in line with The Control of Dust and Emissions during Construction and Demolition SPG.

Defra, Local Air Quality Management Technical Guidance (LAQM TG16), 2016

8.49 Defra, in association with devolved regional environmental protection agencies, has produced technical guidance[22] designed to support local authorities in pursuit of their duties under the Environment Act 1995. It provides the methodology by which key air pollutants such as NO_2, PM_{10} and $PM_{2.5}$ should be monitored, assessed and reported, and provides guidance on the actions to be taken by local authorities to improve local air quality. Whilst London has its own system of LAQM with guidance prepared by the Mayor of London, it in turn refers to this Technical Guidance.

Consultation Feedback

8.50 As discussed in Chapter 2: EIA Process and Methodology, consideration has been given in this assessment to the formal EIA Scoping Opinion comments provided by the LBC and consultees in respect of the proposed development. In addition, consultation has also taken place with the LBC Sustainability Officer. These key considerations are summarised in Table 8.2.

Table 8.2: EIA Scoping Consultation Feedback

Consultee	Comment	Where in the Chapter this comment is addressed
LBC	We accept the proposed scope and consider that the methodology has taken account of all relevant guidance. Additional comments are as follows:	

[19] London Borough of Camden, 2013. Camden Planning Guidance Amenity CPG6 (2013 including further updates 2016). London. LBC.
[20] London Borough of Camden, 2017. Camden Goods Yard Draft Planning Framework.
[21] Institute of Air Quality Management and Environmental Protection UK, 2017. Land-Use Planning & Development Control: Planning for Air Quality.
[22] Department for Environment, Farming and Rural Affairs, 2016. Local Air Quality Management Technical Guidance (England) 2016 (TG16). HMSO.

Table 8.2: EIA Scoping Consultation Feedback

Consultee	Comment	Where in the Chapter this comment is addressed
	• Implications for any relevant non-residential uses proposed should be considered in addition to residential uses, particularly where possible short term exceedances apply.	• Non-residential receptors have not been assessed as annual mean concentrations (monitored and modelled) indicate that short term objectives would not be exceeded.
	• Detailed dispersion modelling will need to be undertaken following the London Council's Air Quality Planning Guidance and LAQM TG.	• Modelling and model verification has been undertaken using relevant guidance.
	• Model verification should be based on latest LAQM TG.	
	• Local monitoring data as well as background data should be used.	• Local monitoring data has been used to verify the model output.
	• If a transport plan is prepared this should be incorporated into the assessment.	• A Transport Plan has been prepared by the Transport consultants which is presented in ES Volume 3B.
	• Time-varying traffic movements can be based on local information.	• Time-varying emissions have not been used as the assessment has focused on annual emissions and impacts.
	• A detailed contour plot of the existing and predicted pollutant concentrations and scale of air quality change with sensitive receptors plotted on the map should be provided.	• Contour plots not produced as the predicted impacts at the modelled receptors clearly show the relevant impacts.
	• Any plume dispersion impacts of the development should be considered.	• Plume dispersion has been undertaken for the CHP impacts.
	• Non-road mobile machinery (NRMM) should be included in the construction impacts.	• ES Chapter 5: Demolition and Construction, confirms that as part of the mitigation of construction impacts, all NRMM would meet the relevant standards defined within the London Demolition and Construction SPG.
	• Real time monitoring will be required to monitor construction impacts.	The need for monitoring will be discussed with the Council based on the outcome of this assessment. The highest risk is associated with the demolition of the existing buildings but this would be relatively short term.

8.51 In consulting with the Sustainability Officer, the overall methodology for the assessment was agreed. It was requested that the Kentish Town Road monitoring site should be used for model verification purposes.

Assessment Methodology

8.52 This assessment considers the likely significant effects of the demolition of the existing buildings, and the construction and operation of the proposed development on the environment with respect to air quality. The key issues considered in this assessment are as follows:

- the potential impact on local air quality and on identified receptors from the demolition and construction activities at the application site;
- the potential impact of traffic and CHP emissions due to the proposed development at existing and proposed on-site receptors located adjacent to the modelled road network in 2024 when the development is completed;
- the introduction of new residential exposure on-site;
- the cumulative effects of the proposed development and cumulative development on local air quality and identified receptors; and
- determination of the development's air quality neutrality in relation to the transport emissions.

8.53 The methodologies adopted to assess these various components are outlined in the following sections.

Study Area

8.54 The study area comprises of the application site, the surrounding road network to the east of the application site where changes in the traffic volumes are anticipated (Chalk Farm Road) and incorporates new and existing sensitive receptors located within and adjacent to these locations. A 1 x 1 km area has also been modelled as part of the CHP assessment. This provides a sufficient modelled area to capture the largest modelled concentrations associated with the CHP emissions.

Baseline Characterisation

8.55 Existing or baseline ambient air quality refers to the concentrations of relevant substances that are already present in the environment; these are present from various sources such as industrial processes, commercial and domestic activities, agricultural activity and traffic sources.

8.56 The proposed development is located within an AQMA. The AQMA encompasses the whole Borough and has been declared for NO_2 (annual mean) and PM_{10} (24-hour). The proposed development is located outside the Camden Clear Zone.

8.57 In order to establish baseline air quality in the vicinity of the application site, relevant monitoring data has been reviewed and assessed. Data was obtained from a number of sources including the LBC's air quality monitoring data website[23] and Defra's background pollution maps[24].

Method of Assessment

Demolition and Construction

Dust Emissions

8.58 Using the London SPG, the construction activities were divided into four types in order to reflect their different potential impacts. These are as follows:

- Demolition;
- Earthworks;
- Construction; and
- Track out.

8.59 With regard to the proposed development, the potential for dust emissions was assessed for each activity that is likely to take place. As required by the demolition and construction SPG, the assessment procedure assumed no mitigation measures are applied. The conditions with no mitigation thus form the baseline or *"do-nothing"* situation for a construction site. The assessment procedure uses the steps provided in the guidance and summarised in Figure 8.1.

[23] https://opendata.camden.gov.uk/stories/s/Camden-Air-Quality-Monitoring/bmrm-k7pv

[24] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013

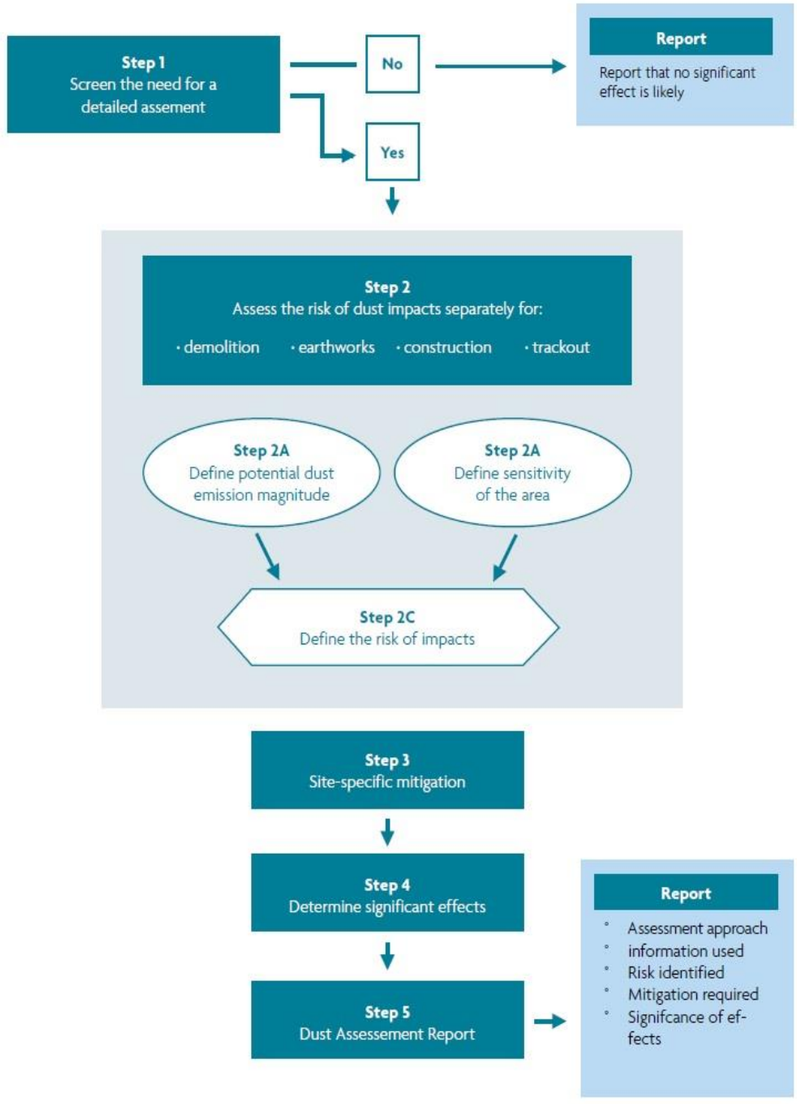

Figure 8.1: Dust Assessment Procedure

Traffic Emissions

8.60 The impacts of the demolition and construction traffic on local air quality has not been assessed quantitatively due to the inconsistent nature of construction traffic and its short-term impact. Notwithstanding this, the impact of track out has been assessed qualitatively as part of the demolition and construction impacts assessment and mitigation measures have been put forward in relation to the emissions of HDV traffic, primarily in relation to all mobile vehicles associated with the demolition and construction complying with the standards of the London Low Emission Zone (LEZ)

Completed Development

Traffic Emissions

Modelled Scenarios

8.61 A future year has been chosen for the assessment, along with the baseline year (2016) that corresponds with the latest year of monitoring data available from the LBC. The future year represents the assumed first full year following completion of the proposed development. Four scenarios have been modelled as part of the air quality assessment. These are as follows:

- Current Baseline (2016);
- Future Baseline (2024);
- Future Baseline (2024) + Proposed Development Flows; and
- Future Baseline (2024) + Proposed Development + Cumulative Developments.

8.62 Traffic flows for these scenarios were provided by the Applicant's transport consultant, Ardent. Information associated with the cumulative schemes was taken from the TAs and/or ESs for those developments.

8.63 The future scenarios was used to determine the potential impact on existing and proposed receptors adjacent to the modelled road network and on-site as a result of emissions associated with the proposed development in 2024.

ADMS-Roads

8.64 Modelling the impact of traffic emissions on the proposed development was undertaken using the latest version of the ADMS-Roads model[25]. ADMS-Roads is significantly more advanced than that of most other air dispersion models in that it incorporates the latest understanding of the boundary layer structure and goes beyond the simplistic Pasquill-Gifford stability categories method with explicit calculation of important parameters. The model uses advanced algorithms for the height-dependence of wind speed, turbulence and stability to produce improved predictions.

8.65 Modelling the impact of traffic emissions on the proposed development was undertaken using the latest version of the ADMS-Roads model[26]. ADMS-Roads is significantly more advanced than that of most other air dispersion models in that it incorporates the latest understanding of the boundary layer structure and goes beyond the simplistic *Pasquill-Gifford* stability categories method with explicit calculation of important parameters. The model uses advanced algorithms for the height-dependence of wind speed, turbulence and stability to produce improved predictions.

8.66 The model is described as a comprehensive tool for investigating air pollution problems due to small networks of roads that may be in combination with industrial and/or point sources, such as a CHP.

Emission Factors

8.67 The Department for Food and Rural Affair (Defra) and the Devolved Administrations have provided an updated Emission Factors Toolkit (Version 7.0) which incorporates updated NOx emissions factors and vehicle fleet information[27]. These emission factors were integrated into the latest ADMS-Roads modelling software. However, in order to undertake a worst-case assessment, emission factors for 2016 have been used for all modelled years.

Traffic Data

8.68 In respect of the completed development stage, a summary of the modelled traffic data used in the assessment is provided in Table 8.3. The A400 Kentish Town Road and A503 Camden Road have been modelled for the purposes of model verification in the current baseline year only. Traffic data for this link has been downloaded from the Department for Transport (DfT)[28].

[25] Model Version: 4.1.1.0., Interface Version: 4.1.0 (16/02/2017)
[26] Model Version: 4.1.1.0., Interface Version: 4.1.0 (16/02/2017)

[27] https://laqm.defra.gov.uk/documents/EFT2016_v7.0.xlsb.zip
[28] http://www.dft.gov.uk/traffic-counts/

8.69 The modelled speeds are also provided. These have been derived from the London Atmospheric Emissions Inventory (LAEI)[29]. However, where a link approaches a junction a speed of 20 kph has been modelled in order to account for slow moving traffic at the junction. This is in accordance with the London Local Air Quality Management Technical Guidance. It has been assumed that the vehicle speeds in 2024 would remain unchanged from the 2016 baseline data.

Table 8.3: Completed Development Modelled Traffic Data

Modelled Year/ Scenario	Link	Baseline flows			Future Baseline + Development Flows			Future Baseline + Development + Cumulative Flows		
		24-Hr AADT	% HDV	Speed (kph)	24-Hr AADT	% HDV	Speed (kph)	24-Hr AADT	% HDV	Speed (kph)
Current Baseline (2016)	Chalk Farm Road (East)	11,345	8.4%	18						
	Chalk Farm Road (West)	9,981	6.9%	19						
	Juniper Cr	3,621	7.5%	48						
	Ferdinand St	2,478	10.9 %	35						
	Camden Rd	29,874	7.7%	18						
	Kentish Town Rd	14,148	11.8 %	17						
Year of Completion (2024)	Chalk Farm Road (East)	11,345	8.4%	18	11,488	9.5%	18	11,768	10.4 %	18
	Chalk Farm Road (West)	9,981	6.9%	19	10,149	8.0%	19	10,289	8.6%	19
	Juniper Cr	3,621	7.5%	48	3,903	7.5%	48	4,323	11.6 %	48
	Ferdinand St	2,478	10.9 %	35	2,478	10.9 %	35	2,478	10.9 %	35

Street Canyons

8.70 A street canyon may be defined as a relatively narrow street with buildings on both sides. Street canyons may result in elevated pollutant concentrations from road traffic emissions due to a reduced likelihood of the pollutants becoming dispersed in the atmosphere. Street canyons have been considered as part of this assessment along the A400 Kentish Town Road and the A503 Camden Road.

Surface Roughness

8.71 A surface roughness of 1.5 m has been used in the model. This value is provided by ADMS-Roads as a typical roughness length for a large conurbation. This value has been used across the modelled domain and reflects how air flow interacts with the urban landscape.

Background Concentrations

8.72 Background NOx, NO_2 and PM_{10} concentrations have been obtained from Defra[30]. These 1 km x 1 km grid resolution maps are derived from a base year of 2013, which are then projected to future years representing the modelled baseline (2016). Background concentrations of NOx, NO_2 and PM_{10} derived from Defra are provided in Table 8.4.

Table 8.4: Background Concentrations

Location	X	Y	Pollutant	2016
Proposed Development	528500	184500	NO_2	32.2
			NOx	53.2
			PM_{10}	20.0
Model Verification	529500	184500	NO_2	34.5
			NOx	58.1
			PM_{10}	20.8

NOx/NO_2 Relationship

8.73 Following recent evidence that shows the proportion of primary NO_2 in vehicle exhaust has increased[31]. As such, a new NOx to NO_2 calculator has been devised[32]. This new calculator has been used to determine NO_2 concentrations for this assessment, based on predicted NOx concentrations using ADMS-Roads. Converted NO_2 concentrations are initially compared to local monitoring data in order to verify the model output. If the model performance is considered unacceptable, then the NOx concentrations are adjusted before conversion to NO_2.

Meteorological Data

8.74 Hourly sequential meteorological data from Heathrow Airport has been used as this will characterise the meteorological conditions across the proposed development. Wind speed and direction data from Heathrow Airport has been plotted as a wind rose in Figure 8.2. The wind rose provides an indication as to the likely predominant wind direction across the application site.

[29] Mayor of London, 2013. London Atmospheric Emissions Inventory (LAEI).
[30] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013
[31] Trends in Primary Nitrogen Dioxide in the UK, Air Quality Expert Group, 2007
[32] https://laqm.defra.gov.uk/documents/no2tonox9_ja-forweb_june2016.xls

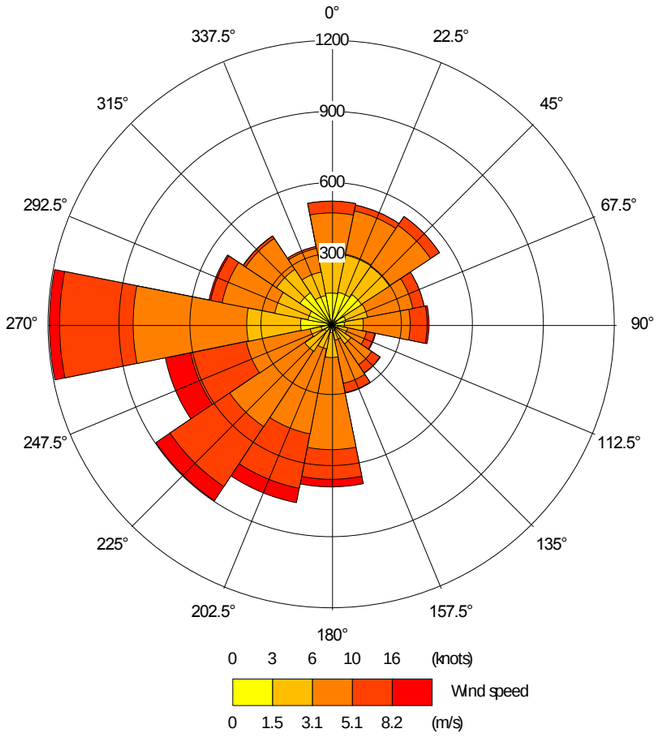

Figure 8.2: Heathrow Airport Wind Rose, 2016

Model Output

8.75 It should be noted that the short-term impacts of NO_2 and PM_{10} emissions have not been modelled as dispersion models are inevitably poor at predicting short-term peaks in pollutant concentrations, which are highly variable from year to year, and from site to site. Notwithstanding this, general assumptions have been made about short term concentrations based on the modelled annual mean concentrations.

8.76 Research undertaken in 2003[33] has indicated that the hourly NO_2 objective is unlikely to be exceeded at a roadside location where the annual mean NO_2 concentration is less than 60 µg/m^3.

8.77 For PM_{10}, a relationship between the annual mean and the number of 24-hour mean exceedances has been devised and is as follows:

8.78 No. 24-hour mean exceedances = -18.5 + 0.00145 x annual mean3 + (206/annual mean)

8.79 This relationship has been applied to the modelled annual mean concentrations (traffic emissions only) in order to estimate the number of 24-hourly exceedances.

[33] Analysis of Relationship between 1-Hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites, Laxen and Marner, 2003

Model Verification

8.80 The LBC undertakes monitoring of NO_2 at a number of locations within the Borough. The location of the monitoring sites used for model verification site are provided in Table 8.5. The Kentish Town Monitoring site was used at the request of LBC.

8.81 The location of these verification sites are provided in Figure 8.3.

Table 8.5: Model Verification Locations

Monitoring ID	Location	X	Y	Height
CA16	Kentish Town Road	529013	185102	2.5
CA23	Camden Road	529173	184129	2.5

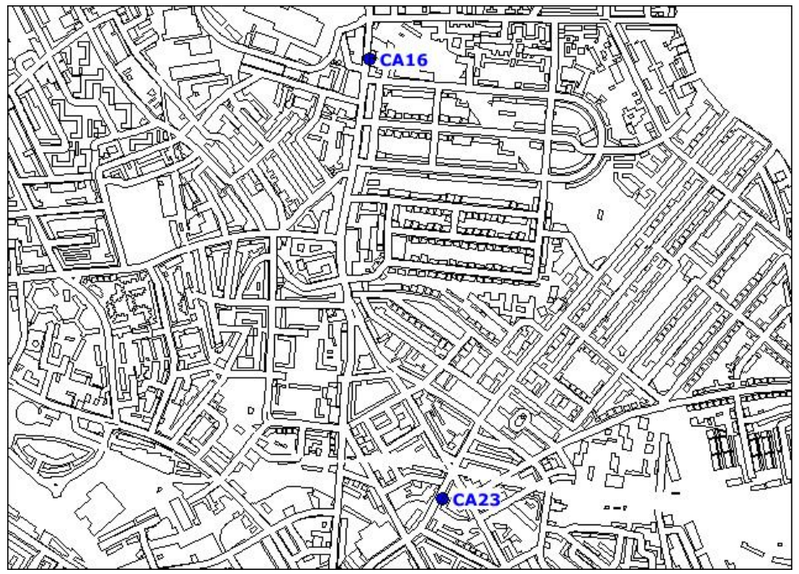

Figure 8.3: Model Verification Locations

Receptor Locations

8.82 In order to assess the potential impact of the proposed development, a number of existing and proposed receptors have been identified adjacent to the modelled road network. These receptors represent the façade of the property. The existing receptors have been chosen given their proximity to the modelled road network. The location of these receptors is provided in Tables 8.4 and 8.5. The location of the modelled receptors is shown in Figures 8.4 and 8.5.

8.83 The receptors identified represent relevant exposure to air quality and are all considered to be highly sensitive uses for the purposes of this assessment, such as residential properties, schools, hospitals or care homes, and where the annual mean objectives apply. Not all receptors adjacent to a modelled road have been included in the assessment as the receptors selected will represent worst case locations e.g. closest to a road and/or modelled junction. Some existing receptors have been modelled at the first-floor level as the ground floor retail units do not represent relevant exposure.

Table 8.4: Existing Off-Site Modelled Receptor Locations

Assessment ID	X	Y	Height	Sensitivity of Receptor
R1	528649	184213	4.5	High
R2	528593	184253	4.5	
R3	528571	184265	4.5	
R4	528523	184282	4.5	
R5	528440	184308	4.5	
R6	528314	184347	4.5	
R7	528246	184378	4.5	
R8	528403	184234	1.5	
R9	528346	184193	1.5	

8.84 Local road traffic emissions will have the greatest impact across the proposed development. As such, the receptors identified as part of the proposed development reflect this e.g. ground floor receptors where the impact from traffic emissions would be greatest. The receptors identified represent the facades of residential units. Children's play areas have not been modelled as they do not represent relevant exposure in relation to the annual mean objectives for NO_2 and PM_{10}. Given the location of the proposed development relative to the local road network the likelihood of the short-term objectives being exceeded at these locations is considered to be low.

Table 8.5: On-Site Modelled Receptor Locations

Assessment ID	X	Y	Height	Sensitivity of Receptor	Assessment ID	X	Y	Height	Sensitivity of Receptor
A1	528380	184168	1.5	High	E1	528460	184116	1.5	High
A2	528345	184162	1.5		E2	528477	184096	1.5	
A3	528358	184138	1.5		E3	528464	184085	1.5	
A4	528333	184134	1.5		E4	528447	184106	1.5	
B1	528432	184197	1.5		E5	528445	184099	1.5	
B2	528474	184155	1.5		E6	528451	184090	1.5	
B3	528437	184119	1.5		E7	528396	184060	1.5	
B4	528396	184160	1.5		E8	528403	184052	1.5	
C1	528477	184175	1.5		F1	528389	184148	1.5	

Table 8.5: On-Site Modelled Receptor Locations

Assessment ID	X	Y	Height	Sensitivity of Receptor	Assessment ID	X	Y	Height	Sensitivity of Receptor
C2	528533	184171	1.5		F2	528426	184104	1.5	
C3	528532	184158	1.5		F3	528387	184071	1.5	
C4	528494	184139	1.5		F4	528350	184115	1.5	
D1	528537	184142	1.5		G1	528394	184300	1.5	
D2	528547	184122	1.5		G2	528420	184277	1.5	
D3	528531	184127	1.5		G3	528387	184268	1.5	
D4	528484	184116	1.5		G4	528361	184294	1.5	

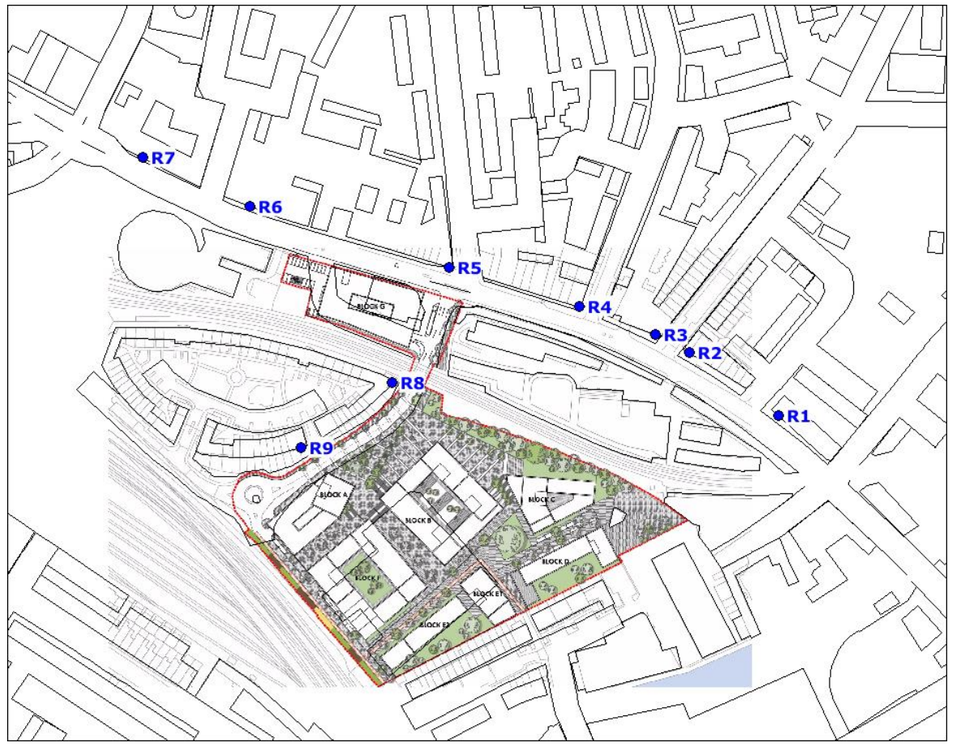

Figure 8.4: Existing Modelled Receptor Locations

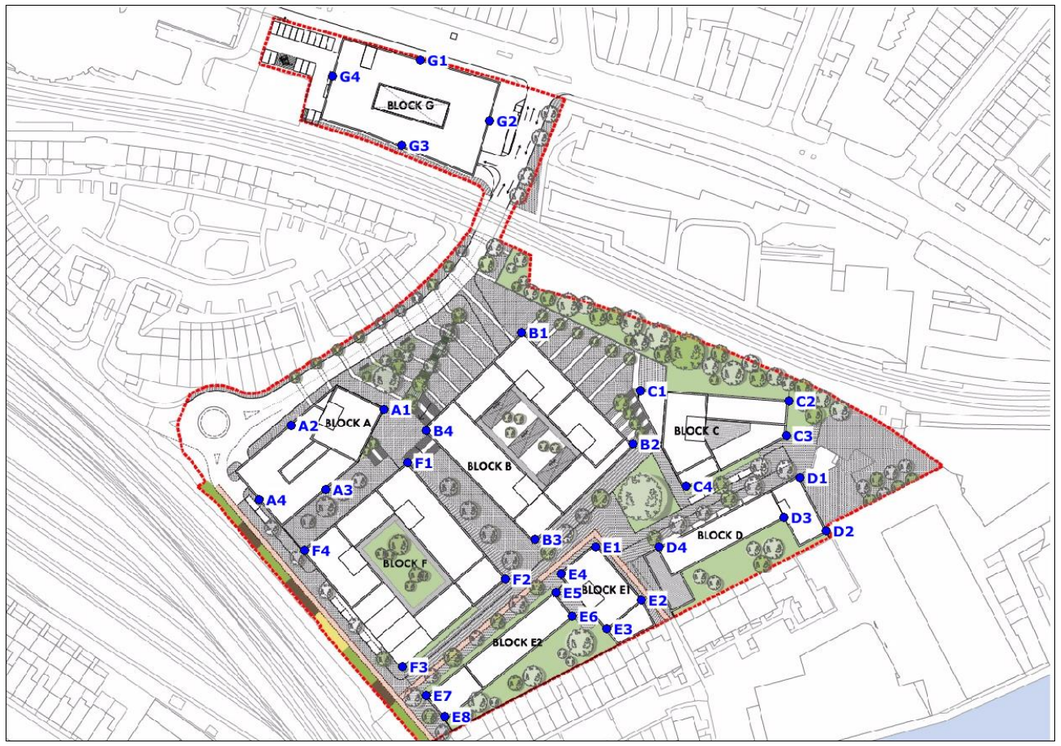

Figure 8.5: Proposed Modelled Receptor Locations

CHP Emissions

Model Output

8.85 Specifications relating to the proposed CHP are detailed in Table 8.6 and have been used in the assessment. The CHP flue is located at the roof level of Block A and would terminate 3.1 m above the roof level.

Table 8.6: Input Parameters for CHP

Input Parameter	Energ-E230 (Low NOx)
OS coordinates of stack (x,y)	528365, 184163
Stack height (m)	55
Stack diameter (m)	0.2
Exit Velocity (m/s)	8.3
Exit temperature (°C)	105
NOx Emission Rate (mg/Nm^3)	50.0

8.86 The six proposed Wessex ModuMax mk^3 boilers have not been modelled as they would only be operational for a maximum of 2 hours per day (600 hours annually for two boilers, 300 hours annually for other boilers). Furthermore, each boiler installed within the proposed development would meet the NOx emissions (40 mg/kWh) as defined within the Sustainable Design and Construction SPG and these emissions have been considered as part of the Air Quality Neutral Assessment for building emissions contained within Appendix D of the Sustainable Design and Construction Assessment which accompanies this application.

8.87 The impact of the CHP has not been modelled across all floor-levels of the proposed development. This is due to the fact the traffic emissions would be the predominant emission source across the proposed development, with the highest concentrations predicted at ground floor level. Whilst the CHP process contribution would be greater with height above ground level, the Predicted Environment Concentration (PEC) would be lower due to the lower impact of vehicle emissions with height. As such, modelling the impact of the CHP at ground floor level presents a worst-case assessment in terms of the combined PEC of background concentrations plus vehicle and CHP emissions.

Emission Rates

8.88 For the purposes of this assessment, it will be assumed that the CHP would be operational 365 days per year at full load, representing the worst-case scenario. This is based on the continuous operation of the CHP and does not include any downtime due to system failures and/or maintenance. Emission rates from the proposed CHP are detailed in Table 8.6.

NOx/NO_2 Relationship

8.89 For NOx emissions from the CHP plant, the conversion to NO_2 was calculated using EA guidance for calculating NO_2 from NOx concentrations. Short term NO_2 concentrations are taken to be 50 % of the NOx concentrations and long term NO_2 concentrations are taken to be 70 % of the NOx concentrations.

Meteorological Data

8.90 Emissions from the CHP have been modelled using the same meteorological data described earlier in this chapter.

Significance Criteria

Demolition and Construction

Dust Emissions

8.91 The risk of dust arising in sufficient quantities to cause annoyance and/or health impacts have been determined using four risk categories: negligible, low, medium and high. A development is allocated to a risk category based on two factors:

- the scale and nature of the works which determines the potential dust emission magnitude as small, medium or large (see Table 8.7); and
- the sensitivity of the area to dust impacts, which is defined as low, medium or high sensitivity.

8.92 These two factors have been combined to determine the risk of dust impacts with no mitigation applied (see Table 8.8). The risk category assigned to the proposed development can be different for each of the four potential activities (demolition, earthworks, construction and track out).

Table 8.7: Dust Emission Magnitude

Activity	Dust Emission Class		
	Large	Medium	Small
Demolition	Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level	Total building volume 20,000 – 50 000m^3, potentially dusty construction material, demolition activities 10-20 m above ground level	Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months

Table 8.7: Dust Emission Magnitude

Activity	Dust Emission Class		
	Large	**Medium**	**Small**
Earthworks	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes	Total site area 2,500 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes	Total site area <2,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <10,000 tonnes, earthworks during wetter months
Construction	Total building volume >100,000 m^3, piling, on site concrete batching; sandblasting	Total building volume 25,000 m3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Track out	>50 HDV (>3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m	10 – 50 HDV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100 m;	<10 HDV (>3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50 m.

Table 8.8: Risk of Dust Impacts

Construction Activity	Sensitivity of Area	Dust Emission Magnitude		
		Large	**Medium**	**Small**
Demolition	High	High Risk	Medium Risk	Medium Risk
	Medium	High Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Negligible
Earthworks	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Track Out	High	High Risk	Low Risk	Low Risk
	Medium	Medium Risk	Low Risk	Negligible
	Low	Low Risk	Low Risk	Negligible

Completed Development

Traffic Emissions

8.93 The joint guidance released by EPUK and the IAQM provides impact descriptors for individual receptors. These descriptors are provided in Table 8.9.

Table 8.9: Impact Descriptors for Individual Receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to AQ objective			
	1%	**2-5%**	**6-10%**	**>10%**
75% or less of AQ objective	Negligible	Negligible	Slight	Moderate
76-94% of AQ objective	Negligible	Slight	Moderate	Moderate
95-102% of AQ objective	Slight	Moderate	Moderate	Substantial
103-109% of AQ objective	Moderate	Moderate	Substantial	Substantial
110% or more of AQ objective	Moderate	Substantial	Substantial	Substantial

CHP Emissions

8.94 The significance of the CHP emissions have been considered in the context of the overall air quality impacts (including background concentrations and vehicle emissions) and compared to the significance criteria provided in Table 8.9.

Assumptions and Limitations

8.95 There are many elements within an Air Quality assessment that generate uncertainty within the modelled results. The inherent uncertainties associated with the modelled traffic data are likely to have the greatest impact on the outcome of the assessment.

8.96 There are also uncertainties associated with the vehicle emission factors used throughout the assessment. Recent analyses of historical monitoring data have identified a disparity between the measured concentrations and the projected decline in concentrations associated with vehicle emissions forecasts. As such, there is little evidence of a consistent downward trend in either NO_x or NO_2 concentrations that would be suggested by emission inventory estimates. As such, the assessment has assumed emission rates from 2016 for all modelled years in the event that future emissions do not decrease.

8.97 The uncertainties associated with vehicle emissions can also be applied to background concentrations, which have not declined as anticipated. As such, the assessment has utilised the background concentrations from 2016 for all modelled years.

8.98 Given the assumptions and limitations discussed above the need to undertake model verification becomes more important. Given that this assessment has undertaken model verification at a number of verification sites the baseline data is considered to be robust.

Baseline Conditions

Current Baseline

8.99 The current baseline includes vehicle flows to and from the existing Morrison's supermarket and PFS. The supermarket has parking for 425 vehicles.

Model Verification

8.100 Using the guidance provided in the London Local Air Quality Management Technical Guidance TG (16), the modelled output has been verified against the monitoring data obtained from the monitoring site located along Kentish Town Road and Camden Road see Figure 8.3). Tables 8.10 – 8.12 provide a summary of the model verification process for NO_2. It has not been possible to verify the modelled PM_{10} concentrations as there are no monitoring sites adjacent to the modelled network.

Table 8.10: Comparison of Modelled and Monitored NO_2 Concentrations (µg/m^3)

Verification Location / ID	Modelled Concentration	Monitored Concentration	Difference: [(modelled - monitored)/ monitored] x100
CA16	50.0	57.9	-13.6%
CA23	56.2	61.7	-8.9%

8.101 As described in the Technical Guidance (LLAQM.TG16), in order to provide more confidence in the model predictions and the decisions based on these, the majority of results should be within ±25% (ideally ±10%) of the monitored concentrations. In order to improve the confidence in modelled NO_2 concentrations across the modelled domain the model output was adjusted. This is described further in the next section.

Model Adjustment

8.102 In order to undertake model adjustment, it is first necessary to derive the monitored and modelled road contributions of NOx (excluding background). The modelled road contribution NOx is taken directly from the ADMS-Roads output before it has been converted to NO_2 using the NOx to NO_2 calculator described earlier in this chapter. The NOx to NO_2 calculator can also be used to derive monitored road contributions of NOx from NO_2 diffusion tube results. A summary of these calculations is provided in Table 8.11.

Table 8.11: Monitored NOx and NO_2 concentrations

Verification Location / ID	Monitored Total NO_2	Defra Background NO_2	Monitored road contribution NO_2 (total – background)	Monitored road contribution NOx (total – background)	Modelled road contribution NOx (excludes background)	Ratio of monitored road contribution NOx / modelled road contribution NOx
CA16	57.9	34.5	23.4	58.7	37.0	1.6
CA23	61.7	34.5	27.2	69.9	53.8	1.3
					Average	**1.4**

8.103 Once the monitored and modelled road contributions of NOx (excluding background) have been derived the contributions of NOx are compared and a ratio derived. In this case the ratio is 1.4 and this factor has been used to adjust the modelled road contribution of NOx. This is shown in Table 8.12.

Table 8.12: Adjustment of Modelled NOx Contributions

Verification Location / ID	Adjustment factor for modelled road contribution	Adjusted modelled road contribution NOx	Modelled total NO_2 (based on empirical NOx/NO_2 relationship)	Monitored total NO_2	% Difference [(modelled – monitored) / monitored] x 100
CA16	1.4	51.8	55.5	57.9	-4.2%
CA23	1.4	75.4	63.5	61.7	2.9%

8.104 Following adjustment of the modelled NOx concentrations by a factor of 1.4 the total NO_2 concentration at the model verification location has been calculated using the method described earlier in this chapter. The revised NO_2 concentration, shown in Table 8.12, indicates a more acceptable model performance when compared against the monitored NO_2 concentrations. As such, an adjustment factor of 1.4 has been applied to all modelled NOx concentrations across the model domain before conversion to NO_2.

Existing Air Quality

8.105 Predicted annual mean concentrations for NO_2 and PM_{10} at the existing receptors listed in Table 8.4 are provided in Table 8.13. Predicted concentrations in 2016 are below the relevant air quality objectives at all existing receptors.

Table 8.13: Predicted Annual Mean NO_2 and PM_{10} Concentrations (µg/m^3) at Existing Receptors, 2016

Receptor	NO_2		PM_{10}	
	Annual Mean	% of AQ Objective	Annual Mean	% of AQ Objective
R1	36.3	90.6%	21.2	52.9%
R2	35.9	89.8%	21.1	52.8%
R3	35.8	89.6%	21.1	52.8%
R4	36.4	91.0%	21.2	52.9%
R5	36.3	90.8%	21.2	52.9%
R6	35.4	88.5%	21.1	52.7%
R7	35.2	88.0%	21.1	52.7%
R8	34.6	86.4%	21.0	52.5%
R9	33.7	84.3%	20.9	52.3%

Future Baseline

8.106 Predicted annual mean concentrations for NO_2 and PM_{10} at the existing receptors listed in Table 8.4 are provided in Table 8.14. Predicted concentrations in 2024 are below the relevant air quality objectives at all existing receptors.

Table 8.14: Predicted Annual Mean NO_2 and PM_{10} Concentrations (µg/m^3) at Existing Receptors, 2024

Receptor	NO_2		PM_{10}	
	Annual Mean	% of AQ Objective	Annual Mean	% of AQ Objective
R1	36.3	90.6%	21.2	52.9%
R2	35.9	89.8%	21.1	52.8%
R3	35.8	89.6%	21.1	52.8%
R4	36.4	91.0%	21.2	52.9%
R5	36.3	90.8%	21.2	52.9%
R6	35.4	88.5%	21.1	52.7%
R7	35.2	88.0%	21.1	52.7%
R8	34.6	86.4%	21.0	52.5%
R9	33.7	84.3%	20.9	52.3%

Sensitive Receptors

Existing Sensitive Receptors

8.107 These are defined within Table 8.4 and shown in Figure 8.3. No ecological receptors were identified or assessed as part of this chapter.

New Sensitive Receptors

8.108 These are defined within Table 8.5 and shown on Figure 8.4.

Potential Impacts and Likely Effects

Demolition and Construction Effects

8.109 In the absence of mitigation, there are two potential significant sources of emissions that could affect air quality during demolition and construction works:

- coarse and fine dust from construction activities including excavation, earthmoving, materials storage and movement of construction vehicles;
- construction plant, both mobile and stationary (e.g. cranes and generators), which emit a mixture of exhaust gases; and
- the potential impact of exhaust emissions from demolition and construction related traffic.

8.110 As indicated in ES Chapter 5: Demolition and Construction Environmental Management, the proposed development works would be sequenced as follows:

- PFS parcel Enabling, Demolition, Construction of the PFS Block and Fit Out for temporary supermarket use at ground floor and offices above; MS parcel fully operational;
- PFS parcel operational as temporary supermarket and office use (on-site receptors); MS parcel Enabling, Demolition and Construction of Blocks A,B,C; and
- PFS parcel conversion of the PFS Block from temporary supermarket to a PFS; MS parcel supermarket operational, Blocks B and C near complete with Blocks A, D, E1, E2 and F under construction.

8.111 There are a numerous off-site residential properties within 350 m of the application site and within 50 m of the routes proposed to be used by construction traffic. In addition early phases of the proposed development (Blocks B and C) would be occupied whilst work on latter phases are ongoing. Thus using the IAQM guidance, a detailed assessment of construction impacts is required.

Embedded Mitigation

8.112 Whilst it is acknowledge that best practice measures would be adopted in managing emissions from the demolition and construction works, and have been considered in the remainder of the ES as embedded mitigation, the Demolition and Construction SPG requires the assessment of demolition and construction effects to be undertaken without consideration of mitigation.

Dust Emissions

8.113 The assessment of construction activities has focused on demolition, earthworks, construction and track out activities at the application site. Using the criteria provided in Table 8.7 the dust emission magnitude for each activity is as follows:

- Demolition = Small
- Earthworks = Large
- Construction = Large
- Track Out = Medium

8.114 Based on the London Plan SPG guidance the sensitivity of the on-site receptors and surrounding area is summarised in Table 8.15.

Table 8.15: Sensitivity of the Surrounding Area

Potential Impact	Activity			
	Demolition	Earthworks	Construction	Track Out
Dust Soiling	Medium	Medium	Medium	Medium
Human Health	Low	Low	Low	Low

8.115 The dust emission magnitudes and sensitivity of the on-site receptors and surrounding area are combined to determine the risk of dust impacts with no mitigation applied. These are summarised in Table 8.16.

Table 8.16: Summary of Dust Risk

Potential Impact	Activity			
	Demolition	Earthworks	Construction	Track Out
Dust Soiling	Low Risk	Medium Risk	Medium Risk	Low Risk
Human Health	Negligible	Low Risk	Low Risk	Low Risk

8.116 On the basis of the above, the likely effect of the proposed development in respect of dust would be significant at off-site receptors and at occupied phased units on-site.

Traffic Emissions

8.117 As indicated in the Assessment Methodology section, the impacts of the demolition and construction traffic emissions on local air quality has not been assessed quantitatively due to the inconsistent nature of construction traffic and its short-term impact. Notwithstanding this, the impact of track out has been assessed qualitatively as part of the demolition and construction impacts assessment and mitigation measures have been put forward in relation to the emissions of HDV traffic, primarily in relation to all mobile vehicles associated with the demolition / construction complying with the standards of the London Low Emission Zone (LEZ)

Completed Development

8.118 Operational impacts on local air quality would primarily arise from exhaust emissions associated with vehicle movements generated as a result of the proposed development. Emissions from road traffic are the major contributor to poor air quality in urban areas within the UK and could contribute to exceedance of the current air quality objectives within the vicinity of the application site. Accordingly, the likely effects associated with vehicle trips generated by the proposed development have been considered within this assessment.

8.119 Existing (or projected) air quality can also impact the occupants of the proposed development, through the introduction of new sensitive receptors into an area of poor air quality.

8.120 Air emissions can arise from on-site energy generating plant associated with electricity, heating, hot water and cooling systems, with the significance of emissions depending on the choice of plant and fuel.

Embedded Mitigation

8.121 Embedded mitigation measures included within the modelled development flows are summarised in Chapter 7. These include Travel Plans for the residential and commercial elements of the proposed development to minimise the reliance on single-occupancy car trips and promote non-car travel. Emissions from the proposed CHP include the use of selective catalytic reduction (SCR), which reduce NOx emissions from the CHP. In additional mechanical whole house ventilation would be provided within all residential units.

Traffic Emissions

Nitrogen Dioxide ($N0_2$)

8.122 Predicted annual mean concentrations for NO_2 at existing receptors in 2024 are provided in Table 8.17. The change in predicted concentrations at existing receptors has also been provided, together with the effect rating for each receptor.

Table 8.17: Predicted Annual Mean NO_2 Concentrations (µg/m³) at Existing Off-Site Receptors, Proposed Development Traffic Only (2024)

Receptor	Future Baseline	Future Baseline + Proposed Development	% of AQ Objective	Change	% Change	Impact
R1	36.3	36.3	90.8%	0.0	0.0%	Negligible
R2	35.9	36.0	90.0%	0.1	0.3%	Negligible
R3	35.8	35.9	89.8%	0.1	0.3%	Negligible
R4	36.4	36.5	91.3%	0.1	0.3%	Negligible
R5	36.3	36.4	91.0%	0.1	0.3%	Negligible
R6	35.4	35.4	88.5%	0.0	0.0%	Negligible
R7	35.2	35.3	88.3%	0.1	0.3%	Negligible
R8	34.6	34.7	86.8%	0.1	0.3%	Negligible
R9	33.7	33.8	84.5%	0.1	0.3%	Negligible

8.123 When comparing the predicted NO_2 concentrations in 2024 with and without the proposed development alone, the effect of development traffic is considered **negligible** at all modelled existing receptors. Overall, the effect of the proposed development traffic on existing receptors would not be significant.

8.124 Predicted annual mean concentrations for NO_2 at proposed receptors in 2024 are provided in Table 8.18.

Table 8.18: Predicted Annual Mean NO_2 Concentrations (µg/m³) at On-Site Receptors, Proposed Development Traffic Only (2024)

Receptor	Future Baseline + Proposed Development	% of AQ Objective	Receptor	Future Baseline + Proposed Development	% of AQ Objective
A1	33.8	84.5%	**E1**	32.9	82.3%
A2	34.5	86.3%	**E2**	32.8	82.0%
A3	33.2	83.0%	**E3**	32.8	82.0%
A4	33.1	82.8%	**E4**	32.9	82.3%
B1	33.8	84.5%	**E5**	32.8	82.0%
B2	33.2	83.0%	**E6**	32.8	82.0%
B3	32.9	82.3%	**E7**	32.7	81.8%
B4	33.4	83.5%	**E8**	32.7	81.8%
C1	33.3	83.3%	**F1**	33.2	83.0%
C2	33.4	83.5%	**F2**	32.8	82.0%
C3	33.3	83.3%	**F3**	32.7	81.8%
C4	33.1	82.8%	**F4**	32.9	82.3%
D1	33.2	83.0%	**G1**	37.8	94.5%
D2	33.1	82.8%	**G2**	36.3	90.8%
D3	33.1	82.8%	**G3**	34.4	86.0%
D4	32.9	82.3%	**G4**	35.0	87.5%

8.125 In terms of introducing new exposure, the predicted concentrations across the proposed on-site receptors are below the relevant objectives for NO_2. Overall, the impact of NO_2 concentrations across the proposed development would be **Negligible**.

Particulate Matter (PM_{10})

8.126 Predicted annual mean concentrations for PM_{10} at existing receptors in 2024 are provided in Table 8.19. The change in predicted concentrations at existing receptors has also been provided, together with the effect rating for each receptor.

Table 8.19: Predicted Annual Mean PM_{10} Concentrations (µg/m³) at Existing Off-Site Receptors, Proposed Development Traffic Only (2024)

Receptor	Future Baseline	Future Baseline + Proposed Development	% of AQ Objective	Change	% Change	Impact
R1	21.2	21.2	53.0%	0.0	0.0%	Negligible
R2	21.1	21.1	52.8%	0.0	0.0%	Negligible
R3	21.1	21.1	52.8%	0.0	0.0%	Negligible
R4	21.2	21.2	53.0%	0.0	0.0%	Negligible
R5	21.2	21.2	53.0%	0.0	0.0%	Negligible
R6	21.1	21.1	52.8%	0.0	0.0%	Negligible
R7	21.1	21.1	52.8%	0.0	0.0%	Negligible
R8	21.0	21.0	52.5%	0.0	0.0%	Negligible
R9	20.9	20.9	52.3%	0.0	0.0%	Negligible

8.127 When comparing the predicted PM_{10} concentrations in 2024 with and without the proposed development alone the effect of development traffic is considered **negligible** at all modelled existing receptors. Overall, the effect of the proposed development traffic on existing receptors would not be significant.

8.128 Predicted annual mean concentrations for PM_{10} at proposed on-site receptors in 2024 are provided in Table 8.20.

Table 8.20: Predicted Annual Mean PM_{10} Concentrations (µg/m³) at Proposed On-Site Receptors, Proposed Development Traffic Only (2024)

Receptor	Future Baseline + Proposed Development	% of AQ Objective	Receptor	Future Baseline + Proposed Development	% of AQ Objective
A1	20.9	52.3%	**E1**	20.9	52.3%
A2	21.0	52.5%	**E2**	20.9	52.3%
A3	20.9	52.3%	**E3**	20.9	52.3%
A4	20.9	52.3%	**E4**	20.9	52.3%
B1	20.9	52.3%	**E5**	20.9	52.3%
B2	20.9	52.3%	**E6**	20.9	52.3%
B3	20.9	52.3%	**E7**	20.8	52.0%
B4	20.9	52.3%	**E8**	20.8	52.0%
C1	20.9	52.3%	**F1**	20.9	52.3%
C2	20.9	52.3%	**F2**	20.9	52.3%
C3	20.9	52.3%	**F3**	20.8	52.0%
C4	20.9	52.3%	**F4**	20.9	52.3%
D1	20.9	52.3%	**G1**	21.3	53.3%
D2	20.9	52.3%	**G2**	21.2	53.0%
D3	20.9	52.3%	**G3**	21.0	52.5%
D4	20.9	52.3%	**G4**	21.1	52.8%

8.129 In terms of introducing new exposure, the predicted concentrations across the proposed on-site receptors are below the relevant objectives for PM_{10}. Overall, the impact of PM_{10} concentrations across the proposed development is considered **negligible**, which is not significant.

Air Quality Neutral Assessment (Transport Emissions)

8.130 Policy 7.14 within the London Plan states that every "*major*" development in Greater London be at least "*air quality neutral*" and not lead to further deterioration of existing poor air quality.

8.131 The air quality neutral assessment has followed the methodology outlined in the Sustainable Design and Construction SPG and the Air Quality Neutral Planning Support Update[34]. Within these documents, benchmarks have been provided in relation to Transport emissions, together with a methodology for calculating the building related emissions for a particular development.

8.132 The completed development would generate 2,953 trips per day from the supermarket (2% HDV), 1,858 from the petrol station (1% HDV), 207 from the residential units (9% HDV) and 75 from the office use. No Transport Emission Benchmarks (TEBs) are provided for the supermarket and petrol station. As such, these have been removed from the air quality neutral calculations. For the residential and office uses the total trips per annum and associated emissions are as follows:

8.133 Residential (C3):

- Total trips per annum = 207 * 365 = 75,555;
- The NOx emission factor is 0.370 g/veh-km and thus the Residential Transport NOx Emission is (75,555 * 0.370) = 28.0 kg/annum
- The PM_{10} emission factor is 0.0665 g/veh-km and thus the **Residential Transport PM_{10} Emissions** is (75,555 * 0.0665) = **5.0 kg/annum**.

8.134 Commercial (B1):

- Total trips per annum = 75 * 365 = 27,375;
- The NOx emission factor is 0.370 g/veh-km and thus the B1 Transport NOx Emission is (27,375 * 0.370) = 10.1 kg/annum
- The PM10 emission factor is 0.0665 g/veh-km and thus the B1 Transport PM10 Emissions is (27,375 * 0.0665) = **1.8 kg/annum**.

8.135 Based on these calculations, the total development emissions are as follows:

- Total Transport NOx Emission = 38.1 kg/annum
- Total Transport PM_{10} Emission = **6.8 kg/annum**

8.136 The Transport Emissions Benchmarks (TEBs) are calculated by multiplying the relevant emission benchmarks by the number of residential properties or floor space for office use:

8.137 Nitrogen Dioxide:

- TEB NOx = 558 g/dwelling/annum * 750 units = 419.0 kg/annum
- TEB NOx = 11.4 g/m²/annum * 10,681m² = **121.8 kg/annum**

8.138 Particulate Matter:

- TEB PM_{10} = 100 g/dwelling/annum * 750 units = 75.0 kg/annum
- TEB PM10 = 2.05 g/m²/annum * 10,681m² = **21.9 kg/annum**

8.139 Based on the comparison between the total transport emissions and Transport Emissions Benchmarks (TEBs) the proposed development meets the air quality neutral requirements and no mitigation is required.

CHP Emissions

8.140 The Maximum predicted NOx/NO_2 concentrations within 1 km² of the proposed CHP is provided in Table 8.21.

Table 8.21: Maximum Predicted Annual Mean Concentrations of NOx/NO_2 (µg/m³), 2024

CHP Process Contribution (PC)		Background	Predicted Environmental Concentration (PEC)
NOx	NO_2		
0.0076	0.053	32.2	32.2

8.141 The maximum predicted off-site concentration occurs approximately 325 m north-east of the proposed CHP. This area is considered relevant exposure with regard to air quality. However, the predicted increase in concentrations in this area is not significant in terms of the maximum predicted impact of the CHP emissions.

8.142 The receptors identified in Table 8.5 were also modelled in order to represent the impact of the CHP emissions on the proposed development. The predicted concentrations at these locations are provided in Table 8.22.

[34] Greater London Authority, 2014. Air Quality Neutral Planning Support Update: GLA 80371.

Table 8.22: Predicted Annual Mean Concentrations of NOx and NO_2 (µg/m3) At Proposed On-Site Receptors, 2024

Receptor	CHP Process Contribution (PC)		Background	Predicted Environmental Concentration (PEC): Background + Traffic + CHP	% of AQ Objective
	NOx	NOx			
A1	0.000	0.0000	32.2	33.8	84.5%
A2	0.000	0.0000	32.2	34.5	86.3%
A3	0.000	0.0000	32.2	33.2	83.0%
A4	0.000	0.0000	32.2	33.1	82.8%
B1	0.000	0.0001	32.2	33.8	84.5%
B2	0.001	0.0004	32.2	33.2	83.0%
B3	0.000	0.0002	32.2	32.9	82.3%
B4	0.000	0.0000	32.2	33.4	83.5%
C1	0.001	0.0004	32.2	33.3	83.3%
C2	0.002	0.0016	32.2	33.4	83.5%
C3	0.002	0.0015	32.2	33.3	83.3%
C4	0.001	0.0008	32.2	33.1	82.8%
D1	0.002	0.0017	32.2	33.2	83.0%
D2	0.003	0.0020	32.2	33.1	82.8%
D3	0.002	0.0016	32.2	33.1	82.8%
D4	0.001	0.0008	32.2	32.9	82.3%
E1	0.001	0.0005	32.2	32.9	82.3%
E2	0.001	0.0009	32.2	32.8	82.0%
E3	0.001	0.0008	32.2	32.8	82.0%
E4	0.001	0.0004	32.2	32.9	82.3%
E5	0.001	0.0005	32.2	32.8	82.0%
E6	0.001	0.0006	32.2	32.8	82.0%
E7	0.000	0.0003	32.2	32.7	81.8%
E8	0.001	0.0005	32.2	32.7	81.8%
F1	0.000	0.0000	32.2	33.2	83.0%
F2	0.000	0.0002	32.2	32.8	82.0%
F3	0.000	0.0002	32.2	32.7	81.8%
F4	0.000	0.0000	32.2	32.9	82.3%
G1	0.001	0.0006	32.2	37.8	94.5%
G2	0.001	0.0005	32.2	36.3	90.8%
G3	0.000	0.0003	32.2	34.4	86.0%
G4	0.001	0.0005	32.2	35.0	87.5%

8.143 The impact of the CHP reaches a maximum of +0.053 µg/m^3 at the modelled receptors, both on and off-site. As such, the combined impact when taking into account the CHP and traffic emissions would still be below the relevant air quality objective. Overall, the impact of the CHP would be **Negligible** and therefore not significant. This includes the existing off-site receptors, where the impact of the proposed CHP would be less than the maximum predicted concentration.

Mitigation and Residual Effects

8.144 As part of the Applicant's commitment to ensure an appropriate development response, the Applicant and its design team have developed a number of measures within the development proposals to ensure that the potential for adverse effects are avoided. These are discussed in the following paragraphs.

Demolition and Construction

Dust Emissions

8.145 As stated in Chapter 5: Demolition and Construction, the Applicant would implement Best Practice Measures during the development works. These measures are summarised in Table 8.23 for ease of reference and are applicable to a medium to high risk sites. These measures would help reduce the effects of the demolition and construction activities in relation to dust soiling and PM_{10} to an acceptable level.

Table 8.23: Mitigation of Demolition and Construction Impacts

Demolition and Construction Activity	Mitigation Measures
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site
	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
	Make a complaints log available to the local authority when asked.

Table 8.23: Mitigation of Demolition and Construction Impacts	
Demolition and Construction Activity Mitigation Measures	
	Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.
Monitoring	Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions.
Preparing and maintaining the site	Plan site layout: machinery and dust causing activities should be located away from receptors.
	Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site.
	Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
	Avoid site runoff of water or mud.
	Keep site fencing, barriers and scaffolding clean using wet methods
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
	Cover, seed or fence stockpiles to prevent wind whipping
Operating vehicle/ machinery	Ensure all non-road mobile machinery (NRMM) comply with standards.
	All mobile vehicles associated with the demolition / construction should comply with the standards of the London Low Emission Zone.
	Ensure all vehicles switch off engines when stationary – no idling vehicles.
	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible.
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
	Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible).
	Use enclosed chutes, conveyors and covered skips.
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods
Waste Management	Reuse and recycle waste to reduce dust from waste materials
	Avoid bonfires and burning of waste materials.

8.146 The above measures would be captured within the proposed development's CMP to be secured by means of an appropriately worded planning condition. The significance of residual dust effect would therefore be reduced to temporary **Negligible** through adoption of these measures.

Completed Development

Traffic Emissions and CHP Emissions

8.147 The predicted change in annual mean NO_2 and PM_{10} concentrations at existing receptors are considered negligible at all modelled receptors. As such, the overall impact of the proposed development is not considered significant. As such, no mitigation is considered necessary.

8.148 The introduction of new exposure is not considered significant in terms of the impacts from road traffic emissions and the proposed CHP emissions. As such, no mitigation measures are considered necessary to protect the future inhabitants of the proposed development from poor air quality.

8.149 Notwithstanding this, the IAQM/EPUK air quality planning guidance makes the following recommendations with regards the mitigation of potential operational impacts. These are as follows and are being adopted by the developer:

- The provision of four Electric Vehicle (EV) charging points per 10 residential dwellings plus the facility to install another four in the future as well as 30 for retail parking spaces and provision for 30 in the future;
- Travel plan that sets out measures to encourage sustainable means of transport (public, cycling and walking) via improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety; and
- All gas-fired boilers to meet a minimum standard of <40mgNOx/kWh.

8.150 Accordingly, the residual impacts would be **Negligible**.

Summary of Mitigation and Residual Effects

8.151 Table 8.24 and 8.25 provide a tabulated summary of the outcomes of the Air Quality Impact Assessment of the proposed development.

Table 8.24: Summary of Proposed Mitigation and Enhancement Measures	
Likely Effects Identified	**Proposed Mitigation / Enhancement Measures**
Demolition and Construction	
Dust soiling and elevated PM_{10} concentrations due to demolition and construction	Best Practice Air Quality Management Measures to be implemented on-site by means of a CMP.
Completed Development	
Increase in air quality pollutants due to traffic and CHP emissions	None required
Impact of traffic and CHP emissions	None required

Table 8.25: Summary of Residual Effects

Receptor	Description of Residual Effect	Nature of Residual Effect*					
		Significance **	+ -	D I	P T	R IR	St Mt Lt
Demolition and Construction							
On and Off-site residential	Dust soiling and elevated PM_{10} concentrations due to demolition and construction works	Negligible	-	D	T	R & IR	St
	Generation of Demolition and Construction Traffic Emissions	Minor	-	D	T	R & IR	St
Completed Development							
Off-site residential	Change in air quality pollutants due to traffic and CHP emissions	Negligible	N/A	D	P	IR	Lt
On-site residential	Change in air quality pollutants due to traffic and CHP emissions	Negligible	N/A	D	P	IR	Lt

Notes:
* - = Adverse/ + = Beneficial; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St-Short term/ Mt –Medium term/ Lt –Long term.
**Negligible/Minor/Moderate/Major

Likely Significant Environmental Effects

8.152 During the demolition and construction stage, standard control measures which would be applied to the proposed development should reduce any potential effects of dust on any existing sensitive receptors and therefore these effects are not likely to be significant.

8.153 On completion of the proposed development, model predictions have shown that there would be no significant increase in pollutant concentrations to any identified existing or proposed on-site receptors, and therefore no likely significant effects.

Cumulative Effects

8.154 The list of cumulative schemes as presented in Table 2.1 and presented in Figure 2.1 in ES Chapter 2: EIA Process and Methodology was considered in undertaking this assessment. Associated traffic flows are as presented in Table 8.3.

Demolition and Construction

8.155 Other cumulative schemes considered within this ES are expected to implement appropriate mitigation measures during their demolition and construction phases via a CMP to be agreed with the LBC. All NRMM is expected to comply with the GLA SPG. The cumulative demolition and construction effects are therefore considered to be not significant.

Completed Development

Nitrogen Dioxide ($N0_2$)

8.156 Predicted annual mean concentrations for NO_2 at existing receptors in 2024, including committed development traffic flows, are provided in Table 8.26. The change in predicted concentrations at existing receptors has also been provided, together with the effect rating for each receptor.

8.157 Predicted annual mean concentrations for NO_2 at proposed receptors in 2024 are provided in Table 8.27.

Table 8.26: Predicted Annual Mean NO_2 Concentrations (µg/m³) at Existing Receptors, Proposed Development Traffic & Cumulative Schemes Traffic (2024)

Receptor	Future Baseline	Future Baseline + Proposed Development + Cumulative Schemes	% of AQ Objective	Change	% Change	Impact
R1	36.3	36.6	91.5%	0.3	0.8%	Negligible
R2	35.9	36.2	90.5%	0.3	0.8%	Negligible
R3	35.8	36.1	90.3%	0.3	0.8%	Negligible
R4	36.4	36.8	92.0%	0.4	1.1%	Negligible
R5	36.3	36.7	91.8%	0.4	1.1%	Negligible
R6	35.4	35.6	89.0%	0.2	0.6%	Negligible
R7	35.2	35.4	88.5%	0.2	0.6%	Negligible
R8	34.6	35.2	88.0%	0.6	1.7%	Slight
R9	33.7	34.2	85.5%	0.5	1.5%	Negligible

8.158 When comparing the predicted NO_2 concentrations in 2024 with and without the proposed and cumulative schemes the effect at existing receptors would be **Negligible or Slight**. Overall, the effect of the proposed and cumulative developments would not be significant.

Table 8.27: Predicted Annual Mean NO_2 Concentrations (µg/m³) at Proposed On-Site Receptors, Proposed Development & Cumulative Schemes Traffic (2024)

Receptor	Future Baseline + Proposed Development + Cumulative Schemes	% of AQ Objective	Receptor	Future Baseline + Proposed Development + Cumulative Schemes	% of AQ Objective
A1	34.1	85.3%	**E1**	33.0	82.5%
A2	35.1	87.8%	**E2**	32.9	82.3%
A3	33.4	83.5%	**E3**	32.8	82.0%
A4	33.3	83.3%	**E4**	32.9	82.3%
B1	34.1	85.3%	**E5**	32.9	82.3%
B2	33.3	83.3%	**E6**	32.9	82.3%
B3	33.0	82.5%	**E7**	32.7	81.8%
B4	33.6	84.0%	**E8**	32.7	81.8%
C1	33.5	83.8%	**F1**	33.4	83.5%
C2	33.5	83.8%	**F2**	32.9	82.3%
C3	33.4	83.5%	**F3**	32.7	81.8%
C4	33.2	83.0%	**F4**	33.0	82.5%
D1	33.3	83.3%	**G1**	38.1	95.3%
D2	33.2	83.0%	**G2**	36.7	91.8%
D3	33.1	82.8%	**G3**	34.6	86.5%

Table 8.27: Predicted Annual Mean NO_2 Concentrations (µg/m³) at Proposed On-Site Receptors, Proposed Development & Cumulative Schemes Traffic (2024)

Receptor	Future Baseline + Proposed Development + Cumulative Schemes	% of AQ Objective	Receptor	Future Baseline + Proposed Development + Cumulative Schemes	% of AQ Objective
D4	33.0	82.5%	**G4**	35.2	88.0%

8.159 In terms of introducing new exposure, the predicted concentrations at the proposed on-site receptors are below the relevant objectives for NO_2. Overall, the impact of NO_2 concentrations across the proposed development in combination with the cumulative schemes would be **Negligible**.

Particulate Matter (PM_{10})

8.160 Predicted annual mean concentrations for NO_2 at existing receptors in 2024, including cumulative development traffic flows, are provided in Table 8.28. The change in predicted concentrations at existing receptors has also been provided, together with the effect rating for each receptor.

8.161 Predicted annual mean concentrations for PM_{10} at proposed receptors in 2024 are provided in Table 8.29.

Table 8.28: Predicted Annual Mean PM_{10} Concentrations (µg/m³) at Existing Receptors, Proposed Development Traffic & Cumulative Scheme Traffic (2024)

Receptor	Future Baseline	Future Baseline + Proposed Development + Cumulative Schemes	% of AQ Objective	Change	% Change	Impact
R1	21.2	21.2	53.0%	0.0	Negligible	53.0%
R2	21.1	21.1	52.8%	0.0	Negligible	52.8%
R3	21.1	21.1	52.8%	0.0	Negligible	52.8%
R4	21.2	21.2	53.0%	0.0	Negligible	53.0%
R5	21.2	21.2	53.0%	0.0	Negligible	53.0%
R6	21.1	21.1	52.8%	0.0	Negligible	52.8%
R7	21.1	21.1	52.8%	0.0	Negligible	52.8%
R8	21.0	21.1	52.8%	0.1	Negligible	52.8%
R9	20.9	21.0	52.5%	0.1	Negligible	52.5%

8.162 When comparing the predicted PM_{10} concentrations in 2024 with and without the proposed and cumulative developments the effect at existing receptors would be **Negligible**. Overall, the impact of the proposed and cumulative schemes is not considered significant.

Table 8.29: Predicted Annual Mean PM_{10} Concentrations (µg/m³) at Proposed Receptors, Proposed Development & Cumulative Scheme (2024)

Receptor	Future Baseline + Proposed Development + Cumulative Schemes	% of AQ Objective	Receptor	Future Baseline + Proposed Development + Cumulative Schemes	% of AQ Objective
A1	21.0	52.5%	**E1**	20.9	52.3%
A2	21.0	52.5%	**E2**	20.9	52.3%
A3	20.9	52.3%	**E3**	20.9	52.3%
A4	20.9	52.3%	**E4**	20.9	52.3%
B1	21.0	52.5%	**E5**	20.9	52.3%
B2	20.9	52.3%	**E6**	20.9	52.3%
B3	20.9	52.3%	**E7**	20.8	52.0%
B4	20.9	52.3%	**E8**	20.8	52.0%
C1	20.9	52.3%	**F1**	20.9	52.3%
C2	20.9	52.3%	**F2**	20.9	52.3%
C3	20.9	52.3%	**F3**	20.8	52.0%
C4	20.9	52.3%	**F4**	20.9	52.3%
D1	20.9	52.3%	**G1**	21.3	53.3%
D2	20.9	52.3%	**G2**	21.2	53.0%
D3	20.9	52.3%	**G3**	21.0	52.5%
D4	20.9	52.3%	**G4**	21.1	52.8%

8.163 In terms of introducing new exposure, the predicted concentrations at the proposed on-site receptors are below the relevant objectives for PM_{10}. Overall, the impact of PM_{10} concentrations across the proposed development in combination with the cumulative schemes would be **Negligible**.

Summary

8.164 This chapter of the ES has assessed the likely significant effects of the demolition of the existing buildings, and the construction and operation of the proposed development on the environment with respect to air quality. The key issues considered are as follows:

- the potential impact on local air quality and existing receptors from construction activities at the site;
- the potential impact of traffic and CHP emissions due to the proposed development at existing and proposed receptors located adjacent to the modelled road network; and
- the introduction of new exposure adjacent to the modelled road network.

Demolition and Construction

8.165 A qualitative assessment of the potential effects from construction activities has been undertaken using the latest guidance issued by the Greater London Authority in July 2014.

8.166 During the demolition and construction works, there is the potential that emissions of dust arising from the application site could result in nuisance at nearby existing residential properties and those parts of the proposed development built and occupied in the early phases whilst construction work continues on the remainder of the application site.

8.167 Based on criteria set out in the Institute of Air Quality Management the construction works present a high risk of resulting in dust impacts in the absence of appropriate mitigation. With the implementation of standard best practice mitigation measures, which would be set out within a CMP to be agreed with LBTH, it is anticipated that dust effects could be mitigated to at worst to be of temporary Slight Adverse significance at existing and future on-site receptors.

8.168 The impacts of the demolition and construction traffic emissions on local air quality has not been assessed quantitatively due to the inconsistent nature of construction traffic and its short-term impact.

8.169 The cumulative scenario includes a significant number of HDV movements associated with other cumulative schemes in the area, such as HS2. Based on these cumulative traffic flows, the impact of these HDV movements are not considered significant along Chalk Farm Road. These HDV flows are more than those associated with the proposed development (as shown in Table 8.26 and 8.28) so the impact of demolition and construction traffic from the proposed development is considered negligible. Notwithstanding this, the impact of track out has been assessed qualitatively as part of the demolition and construction impacts assessment and mitigation measures have been put forward in relation to the emissions of HDV traffic, primarily in relation to all mobile vehicles associated with the demolition / construction complying with the standards of the London Low Emission Zone (LEZ).

Completed Development

8.170 The air quality assessment has considered changes in traffic levels along the local road network as a result of the proposed development. Nitrogen oxides (NOx) and particulate matter (PM_{10}) have been modelled for the assessment. Changes in air quality impacts at existing receptors as a result of the proposed CHP plant and from changes to traffic flows have been considered following the most recent Environmental Protection UK and the Institute of Air Quality Management (IAQM) air quality planning guidance.

8.171 The change in predicted PM_{10} and NO_2 concentrations at existing receptors in 2024 following completion of the proposed development would be negligible (not significant) in terms of effect.

8.172 The assessment has also considered the cumulative impacts from the proposed and committed developments in the area. The change in predicted PM_{10} and NO_2 concentrations at existing receptors in 2024 following completion of the proposed and committed developments is considered negligible (not significant) in terms of effect. As such, no mitigation is considered necessary.

8.173 The assessment has also modelled the effect of the proposed CHP. The effects are not considered significant and no mitigation is considered necessary. If a CHP is installed with a lower output than the Ener-G E230 then the modelled assessment within this chapter would present a worst case assessment.

8.174 In terms of introducing new exposure, the predicted PM_{10} and NO_2 concentrations at the proposed receptors are below the relevant objectives.

9 NOISE AND VIBRATION

Introduction

9.1 This chapter of the ES sets out the assessment of anticipated noise and vibration impacts of the proposed development, specifically the effects of predicted noise conditions on the proposed development and the effects likely to be generated by the proposed development on noise sensitive receptors within the study area during the demolition and construction works and upon completion and operation/occupation of the proposed development.

9.2 In the context of this assessment, noise is defined as unwanted or undesirable sound derived from sources such as construction, road traffic, railway traffic, and supermarket movements (collections/deliveries once the supermarket is operational). Vibration is defined as the transmission of energy through the medium of ground or air resulting in small movements of the transmitting medium, such as a building, which can cause discomfort to people or even damage to structures if the movements are large enough.

9.3 This chapter describes the legislative and planning policy of relevance to the application site in the context of noise and vibration; the baseline conditions currently existing at the application site; the methods used to assess the potential impacts and likely effects arising from the proposed development; the potential impacts and likely effects of the proposed development taking into account embedded mitigation; and the residual effects following consideration of any required mitigation measures.

9.4 The assessment covers the effect of construction noise and vibration on existing surrounding noise sensitive receptors and occupied units of early completed phases; the effect of plant noise and altered traffic flows from the completed development on existing surrounding noise sensitive receptors; the existing ambient noise environment (predominantly rail, road and entertainment noise) on the proposed residential and commercial properties and on the public and private amenity spaces; as well as the effect of ambient vibration on the proposed residential properties.

9.5 The ES chapter should be read in conjunction with Technical Appendices 9.1 to 9.6 in ES Volume 3A, which provide information on Acoustic Terminology; Baseline Noise and Vibration Measurements; Traffic Flow Data; Amenity Space Calculations; as well as Glazing Calculations and Mitigation.

Legislation and Policy Context

9.6 The Department of the Environment, Food and Rural Affairs (Defra) is responsible for all aspects of noise policy in England. Management and enforcement of noise policy is the joint responsibility of the EA and Local Planning Authorities.

9.7 The aim of noise policy within England has been to protect individuals from excessive noise levels both in the workplace and within their homes. It has been recognised that severe annoyance to individuals due to noise can lead to sleep disturbance and adverse health effects.

National Legislation and Policy

National Planning Policy Framework, 2012

9.8 The NPPF[1] sets out the Government's economic, environmental and social planning policies for England. It attempts to summarise in a single document all previous national planning policy advice. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

9.9 The NPPF sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

9.10 Section '11: Conserving and enhancing the natural environment', states that the planning system should contribute to and enhance the natural and local environment by:

- *preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability*"

9.11 The document also states that planning policies and decisions should aim to:

- "*avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

9.12 As stated above, this document makes reference to avoiding noise generation from new developments that would adversely impact on health and quality of life. It effectively supersedes Planning Policy Guidance 24 (PPG24)[2].

Noise Policy Statement for England, 2010

9.13 To avoid and mitigate adverse noise effects on health arising from and impacting on new development, the NPPF makes reference to Noise Policy Statement for England (NPSE)[3].

9.14 The NPSE was published in March 2010 and covers all forms of noise other than occupational noise. For the purposes of this report 'Neighbourhood Noise' is most relevant as defined at paragraph 2.5:

- "*neighbourhood noise which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street*."

9.15 The NPSE has three main aims, which can be summarised as follows:

The first aim of the Noise Policy Statement for England:

"Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise"

The second aim of the Noise Policy Statement for England:

"Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise"

[1] Department for Communities and Local Government, 2012. Notional Planning Policy Framework, HMSO

[2] The Office of the Deputy Prime Minister, now the Department for Communities and Local Government, 1994. Planning Policy Guidance 24: Planning and Noise.

[3] Department of Environment, Food and Rural Affairs, 2010. Noise Policy Statement for England.

The third aim of the Noise Policy Statement for England:

"Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise"

9.16 The explanatory note to the NPSE introduces three concepts relating to the adverse impacts of noise. The following three statements have been reproduced from the explanatory note:

- "NOEL – No Observed Effect Level: This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise."
- "LOAEL – Lowest Observed Adverse Effect Level: This is the level above which adverse effects on health and quality of life can be detected"
- "SOAEL – Significant Observed Adverse Effect Level: This is the level above which significant adverse effects on health and quality of life occur."

9.17 The NPSE acknowledges that the values for NOEL, LOAEL and SOAEL are likely to vary depending on the noise source and environment and at present, there are no defined numerical values to allow flexibility within the policy until further evidence and guidance is presented. For the purpose of this assessment, the aim is to mitigate against and minimise noise levels as far practicable, thus minimising adverse effects.

Planning Practice Guidance

9.18 The PPG[4] relates the three concepts of NOEL, LOAEL and SOAEL to perceptions of noise, and gives guidance on how these different levels should be treated.

9.19 The three levels are summarised as follows, in terms of perceptions and the recommended action:

- NOEL: *"Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life."*
  - Action: No specific measures required;
- LOAEL: *"Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life."*
  - Action: Mitigate and reduce to a minimum.
- SOAEL: "*The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.*"
  - Action: Avoid

9.20 PPG also introduces a final level, Unacceptable Adverse Effect. Based on the nature of the proposed development, the three earlier discussed levels have been considered within this assessment to address anticipated noise effects.

Control of Pollution Act, 1974

9.21 The Control of Pollution Act, 1974[5], Part III forms a refined combination of three earlier documents and replaces these. The three replaced documents are: the Public Health Act, 1936, the Noise Abatement Act 1960 and the Public Health Act 1990, Part III.

9.22 The LBC has powers under the Control of Pollution Act 1974 to control noise from construction sites. Section 60 of the Act allows a local authority to serve a notice of its requirements for the control of site noise. This notice may include specification of plant that is or is not to be used, hours during which the construction can be carried out and levels of noise emission.

9.23 Section 61 of the Act allows a contractor or developer to take the initiative and agree with the local authority the methods of construction, steps to minimise noise and hours of work, prior to works being undertaken. Aiming to avoid a significant impact on receptors through the use of quieter plant and equipment, techniques such as timing of works, and mitigation such as screening and distance separation as far as it is deemed practicable, is collectively referred to as 'Best Practicable Means' (BPM).

9.24 Where the site can be shown to be using BPM, this can be used as a defence against a notice being served or other enforcement action.

Regional Policy

The London Plan Spatial Development Strategy for London Consolidated with Alterations since 2011, 2016

9.25 In March 2016, the updated London Plan[6] was published by the GLA. The London Plan provides an overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20–25 years. The Plan brings together the geographic and locational aspects of the Mayor's other strategies, including a range of environmental issues such as climate change (adaptation and mitigation), air quality, noise and waste.

9.26 Relevant policies to this assessment are summarised as follows:

- Policy '5.3 - Sustainable design and construction' lists sustainable design principles including "*minimising pollution (including noise, air and urban runoff).*"
- Policy '7.15 - Reducing and managing noise, improving and enhancing the acoustic environment and promoting appropriate soundscapes' states the following:

  "Development proposals should seek to manage noise by:

  A avoiding significant adverse noise impacts on health and quality of life;

  B mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens on existing businesses;

  D separating new noise sensitive development from major noise sources (such as road, rail, air transport and some types of industrial development) through the use of distance, screening or internal layout – in preference to sole reliance on sound insulation; and

  E where it is not possible to achieve separation of noise sensitive development and noise sources, without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through the application of good acoustic design principles;"

The Mayor's Ambient Noise Strategy

9.27 The Mayor's Ambient Noise Strategy[7] aims to identify practical actions and ways forward in addressing noise nuisance, especially in transport and through the planning system. The strategy acknowledges that setting of blanket standards is not appropriate for noise issues and that "*Guidelines produced under the*

[4] http://webarchive.nationalarchives.gov.uk/20140724121321/http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/
[5] Secretary of State, 1974. Control of Pollution Act, HMSO.
[6] Greater London Authority, 2016. The London Plan – Spatial Development Strategy for London Consolidated with alterations since 2011. London. GLA.
[7] Greater London Authority, 2004. Sounder City, The Mayor's Ambient Noise Strategy. London. GLA.

auspices of the World Health Organisation" can be seen as aspirational targets based on the precautionary principle.

Sustainable Design and Construction Supplementary Planning Guidance, 2014

9.28 The Sustainable Design and Construction - Supplementary Planning Guidance[8] aims to ensure construction and development in London achieves the highest standard of sustainable design, in order to ensure a high level of environmental performance.

9.29 In terms of noise, the identified relevant priorities are as follows:

- "*Areas identified as having positive sound features or as being tranquil should be protected from noise; and*
- *Noise should be reduced at source, and then designed out of a scheme to reduce the need for mitigation measures*."

Local Policy

London Borough of Camden Core Strategy and Development Policies Documents 2010-2025, 2010

9.30 The LBC Core Strategy[9] sets out the key elements of the Council's planning vision and strategy for the borough. Policy 'CS5 – Managing the impact of growth and development' requires of development to protect and enhance the environment including the amenity and quality of life of local communities. In respect of amenity, paragraph 5.7 refers to noise as a particular issue in the borough.

9.31 Policy 'DP28 - Noise and vibration' of the Camden Development Policies[10] document states the following:

"The Council will seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for:

a) development likely to generate noise pollution; or

b) development sensitive to noise in locations with noise pollution, unless appropriate attenuation measures are provided.

9.32 Development that exceeds Camden's Noise and Vibration Thresholds will not be permitted. Relevant thresholds to this development (residential sites adjoining railways) are summarised as follows:

- Table A: Noise levels at which planning permission will not be granted (levels 1m external from noise sensitive facade).

  Daytime and Evening (07:00 - 23:00): 74 dB LAeq,16hr,
  Night-time (23:00 - 07:00): 66 dB LAeq,8hr

- Table B: Noise levels at which attenuation measured will be required (levels 1m external from noise sensitive facade).

  Daytime (07:00 - 19:00): 65 dB LAeq,12hr,
  Evening (19:00 - 23:00): 60 dB LAeq,4hr
  Night-time (23:00 - 07:00): 55 dB LAeq,8hr

- Table C: Vibration levels at which planning permission will not be granted.

  Daytime and Evening (07:00 - 23:00): 0.2-0.4 VDV ms-1.75,
  Night-time (23:00 - 07:00): 0.13 VDV ms-1.75.

9.33 The Council will only grant permission for plant or machinery if it can be operated without causing harm to amenity and does not exceed our noise thresholds.

9.34 The Council will seek to minimise the impact on local amenity from the demolition and construction phases of development. Where these phases are likely to cause harm, conditions and planning obligations may be used to minimise the impact."

Draft London Borough of Camden Local Plan, 2016

9.35 The draft LBC Local Plan[11], would, when adopted, replace the Core Strategy and Development Policies documents.

9.36 Policy A4 in the draft plan is relevant to this assessment and covers noise and vibration, referencing Camden's Noise and Vibration Thresholds in Appendix 2 of the plan. It states that planning permission will not be granted for developments likely to generate unacceptable noise and vibration impacts, or noise sensitive development in locations which experience high levels of noise, unless appropriate attenuation measures can be provided.

Camden Planning Guidance 6 – Amenity, 2016

9.37 LBC has published a range of 'Camden Planning Guidance'[12] documents that supports the policies set out in their LDF, confirming how these should be followed in practical terms. CPG6 relates to amenity and includes advice on how the impact on noise and vibration can be minimised via design, built fabric and by implementing features such as landscaping and barriers. The document outlines the Borough's preference hierarchy when controlling noise which is summarised as follows: reduce the noise at its source; separate the development from the noise source or to use barriers; and use of construction material such as acoustic glazing.

Camden Goods Yard Draft Planning Framework

9.38 It is the LBC's intention that the planning framework for Camden Goods Yard[13] will be adopted as a Supplementary Planning Document. The draft version of this SPD makes no reference to noise and vibration.

Other Guidance

9.39 In addition to the above, consideration has been given by the guidance provided in the following British Standards and good practice documents:

- BS8233:2014 '*Sound insulation and noise reduction for buildings*'[14] describes recommended acceptable internal noise levels for residential spaces during daytime and night-time hours. Guidance is given for internal spaces, such as living rooms and bedrooms, and for outdoor amenity space.
- BS6472-1:2008 '*Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting*'[15] prescribes measurement and analysis techniques for assessing whether vibration levels within different building types will have a negative impact on the amenity of occupants.
- World Health Organisation: '*Guidance for Community Noise'*[16] gives advice on ambient and maximum noise levels that should not be exceeded in order to provide a suitable living environment. The

[8] Greater London Authority, 2014. Sustainable Design and Construction Supplementary Planning Guidance. London. GLA.

[11] London Borough of Camden, 2016. Camden Local Plan, Proposed Submission 2016.
[11] London Borough of Camden, 2016. Camden Local Plan, Proposed Submission 2016.

[12] London Borough of Camden, 2016. Camden Planning Guidance 6 – Amenity.
[14] British Standards Institution, 2014. BS 8233 2014 Guidance on sound insulation and noise reduction for buildings, BSI.
[14] British Standards Institution, 2014. BS 8233 2014 Guidance on sound insulation and noise reduction for buildings, BSI.
[15] British Standards Institution, 2008. BS 6472:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting, BSI.
[16] World Health Organisation. 2000. Guidelines for Community Noise. Geneva. WHO.

guidance shown above taken from BS8233:2014 and BS8233:1999 is based on these guidelines, so is largely the same.

- BS4142:2014 '*Methods for rating and assessing industrial and commercial sound*'[17] gives guidance on calculating and assessing the predicted noise emissions of proposed commercial and industrial noise sources in terms of likelihood of having a detrimental impact on existing noise sensitive receivers. Noise rating levels are calculated according to the standard and compared against the measured existing background noise level.
- BS5228-1:2009 '*Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'* [18] gives guidance on the effects of noise generated during the construction phase of a development. Methodology is proposed to predict the level of noise that will be experienced at noise sensitive receptors and guidance is given on mitigation techniques to minimise the impact of noise, including adoption of BPM.
- BS5228-2:2009 '*Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration*'[16] provides guidance with regards to vibration in terms of effects on amenity of sensitive receptors as well as guidance on levels of vibration that cause damage to existing structures and buildings. The main factors to consider for vibration are the duration and frequency content of vibration as well as the sensitivity of receptors.
- Design Manual for Roads and Bridges [DMRB] Volume 11[19] gives the expected impact an increase in road traffic will have on sensitive receptors. Guidance is given on the significance impacts of short term increases (e.g. due to construction traffic) and long-term increases (e.g. due to the operation of the proposed development).

Consultation Feedback

9.40 As discussed in Chapter 2: EIA Process and Methodology, consideration has been given in this assessment to the formal EIA Scoping Opinion comments provided by the LBC and consultees in respect of the proposed development.

Table 9.1: EIA Scoping Consultation Feedback

Consultee	Comment	Where in the Chapter this comment is addressed
LBC	The development should take into account the current noise environment from nearby entertainment premises such as "Proud Camden". Close liaison will be required during the design stages of the development to ensure minimal impact during the construction works and also to ensure inter-compatibility between the development itself and neighbouring, often noise-generating, businesses.	The assessment methodology applied in this assessment was designed to ensure noise from all nearby sources was taken into account - see Potential Impacts and Likely Effects section - Completed Development, Site Suitability - Internal Noise. Proud Camden and other identified entertainment have been considered in this assessment - see Sensitive Receptors section.
LBC	You are advised that Camden policy DP28 (Noise and vibration) is currently being updated as part of the Local Plan review Plant noise will need to be designed to at least 10dBA, or 15dBA where the source is tonal, as assessed according to BS4142:2014.	The emerging Local Plan has been considered in the Local Policy section. Plant noise has been considered in the Potential Impacts and Likely Effects section - Completed Development - Commercial Noise Sources
LBC	Enhanced sound insulation will be sought between residential premises to protect against noise equal to DnT,w and L'nT,w of at least 5dB above the Building Regulations value. Where there may be residential above any commercial premise sound insulation equal to DnT,w and L'nT,w of at least 10dB above the Building Regulations.	The suitability of the proposed development has been considered in the Potential Impacts and Likely Effects section - Site Suitability for Proposed Use - Internal Noise
LBC	A detailed DMP/CMP should be provided at an early stage, as well as a servicing management plan detailing times and frequency of deliveries/collections and how noise mitigation will be achieved.	Please see Chapter 5: Demolition and Construction Also see, Potential Impacts and Likely Effects section - Construction Noise, Construction Vibration, Construction Traffic Noise

9.41 In addition, discussions were had via email with the LBC's Environmental Health Officer, Maya Rhodes on 1 June 2016 to agree the methodology to measure ambient noise and vibration. A formal response was received on 28 September 2016 to confirm that the methodology was acceptable.

9.42 It is noted that during public consultations, residents raised concerns with regard to noise from the proposed re-located bus stop on Stephenson Street. As the requirement for an assessment of the bus stop was not identified in the EIA scoping process or required as part of the agreed methodology discussed with the Environmental Health Officer, this has been addressed within a separate Noise Impact Assessment report that accompanies the application. The assessment of the relocated bus stop confirms that no significant effects would arise from bus noise and has therefore not been repeated in this chapter.

Assessment Methodology

Study Area

9.43 The study area focuses on the application site, which includes the existing MS parcel and PFS parcel. The assessment also takes into account existing railway lines, access roads and residential and commercial uses along these access road.

Baseline Characterisation

Noise and Vibration Survey

9.44 Baseline noise surveys were undertaken at four locations around the application site between 6 July 2016 and 13 July 2016 at Positions 1, 2 and 3, and between 6 July 2016 and 11 July 2016 at Position 4. All procedures were verified with LBC prior to the surveys being undertaken.

[17] British Standards Institution, 2014. British Standard 4142:2014 Method for Rating and Assessing Industrial and Commercial Sound. BSI.
[18] British Standards Institution, 2014. BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites, BSI.
[19] Highways Agency, 2011. Design Manual for Roads and Bridges Volume 11 Section 3 Part 7, HA.

9.45 The survey methodology was in accordance with the requirements of British Standard 7445-2:1991[20] 'Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use'.

9.46 Noise measurements were largely unattended, although numerous visits were made to site during the survey period in order to move vibration monitoring equipment and swap batteries. Observations of prevailing noise sources were made during these visits.

9.47 Figure 9.1 shows the monitoring locations used for both noise and vibration surveys. Positions shown in red indicate noise measurements only, while positions shown in green indicate noise and vibration measurements.

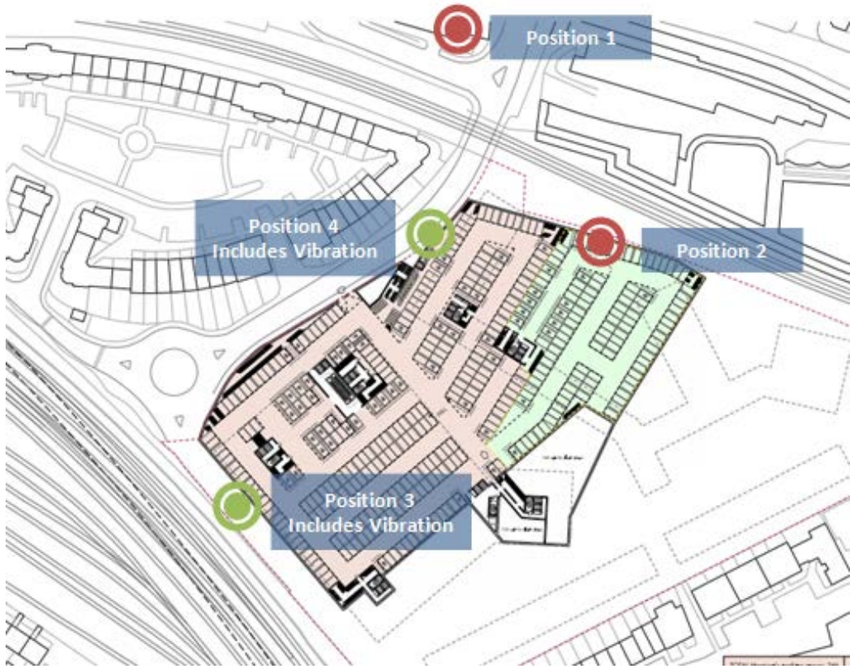

Figure 9.1: Noise and Vibration Monitoring Locations

9.48 Appendix 9.2 provides survey details including equipment used, as well as the measurement results.

9.49 During the course of the noise surveys, a vibration monitor was placed at two of the four monitoring positions as shown in Figure 9.1. The vibration surveys lasted 48 hours at each location surveyed.

9.50 The vibration surveys were positioned to encapsulate vibration levels due to railway lines adjacent to the application site, as well as the existing levels of vibration experienced at residential premises.

9.51 Full details of the equipment used, as well as the measurement results are provided in Appendix 9.2.

9.52 Baseline traffic data as presented in Technical Appendix 9.3 was used for verification/validation purposes.

Method of Assessment

Demolition and Construction Plant Noise

9.53 In order to predict and assess the level of noise at noise sensitive receptors due to proposed demolition and construction works, calculations were carried according to the methodologies described in BS5228 Part 1.

9.54 Based on the proposed plant and machinery to be used for different processes, guideline sound power levels were taken from the standard to give representative levels of noise expected at source.

9.55 Corrections were applied to the representative source noise levels to take account of:

- The percentage 'on' time of the item of plant or machinery during the reference period being assessed;
- The distance between the source and receptor, accounting for factors such as ground absorption (if applicable) and atmospheric absorption;
- Screening between the source position and receptor (either inherent, due to existing building structures, or proposed mitigation measures such as site hoarding or local screening); and
- Effects due to reflections from the surrounding environment, e.g. ground reflections or reflections from surrounding buildings.

9.56 Calculations were undertaken considering the information presented in ES Chapter 5: Demolition and Construction, and incorporating the different factors described above.

Demolition and Construction Traffic Noise

9.57 In order to assess the potential demolition and construction traffic impacts on existing ambient noise levels, the guidance and methodologies set out in DMRB were used.

9.58 DMRB establishes a methodology to predict the increase in ambient noise at a receptor caused by an increase in traffic flow compared to baseline levels. The assessment gives a predicted increase in the $L_{A10,18hr}$ road traffic noise level.

9.59 As indicated in ES Chapter 5: Demolition and Construction Environmental Management, the proposed development works would be sequenced as follows:

- PFS parcel Enabling, Demolition, Construction of PFS Block and Fit Out for temporary supermarket use at ground floor and offices above; MS parcel fully operational;
- PFS parcel operational as temporary supermarket and office use (on-site receptors); MS parcel Enabling, Demolition and Construction of Blocks A,B,C; and
- PFS parcel conversion of PFS Block from temporary supermarket to a PFS; MS parcel supermarket operational, Blocks B and C near complete with Blocks A, D, E1, E2 and F under construction.

9.60 The proposed demolition and construction traffic flows for this scenario are presented in Chapter 5: Demolition and Construction and was incorporated into future traffic flow data provided by the Applicant's transport consultant, which was used to calculate the relative increase in traffic flows due to demolition and construction traffic and as such, the increase in road traffic noise levels at identified receptors.

9.61 The following scenarios were assessed:

- Current and Future Baseline (for reference),
- Future Baseline + Proposed Development (MS Parcel under Construction),

[20] British Standards Institution, 1991. 7445-2:1991 Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use, BSI

Demolition and Construction Vibration

9.62 Vibration caused during the demolition and construction stage of a development is typically considered in terms of potential damage to existing buildings, and annoyance due to human perception.

9.63 Although damage to buildings is a common concern raised prior to construction works, human perception commonly occurs at lower levels of vibration and as such, is more commonly used as the basis for assessment.

9.64 BS5228 Part 2 gives a methodology for predicting vibration levels due to percussive or vibratory piling only. All other data is in the form of historical field measurements of different activities and machinery.

9.65 Transmission of vibration is heavily dependent on the ground type of the site and surroundings, and can therefore be difficult to accurately predict.

9.66 Based on the proposed CMP and BPM, vibration would be limited at identified receptors. Vibration monitoring will be undertaken during the demolition and construction phases, with an agreed criterion set to ensure any exceedances are detected and acted upon.

Completed Development

Site Suitability for Residential Development - Noise

9.67 Based on the complexity of the application site and surrounding area, it has been concluded that the production of a noise map would not enhance the understanding of noise propagation around the application site. Calculations to predict noise levels affecting proposed residential spaces have therefore been undertaken based on measured noise levels obtained during surveys and acoustic formulae.

9.68 The measured baseline conditions were adapted using the guidance of DMRB to include predicted additional noise due to future traffic flows. The data used in calculations were adapted to consider the following worst-case scenario such that the proposed development would be 'future proof':

- Future Baseline (2024) + Proposed Development + Cumulative Schemes.

9.69 Based on the calculated noise levels at each building facade, calculations were then undertaken to predict the level of noise inside residential spaces. In this way, the calculations take account of proposed glazing and ventilation schedules to ensure the internal levels are in line with the recommendations of relevant British Standards and the requirements of the LBC.

9.70 Similarly, calculations have been undertaken for external amenity areas. The calculations have taken account of the future predicted ambient noise levels as detailed above, and proposed site zoning, which introduces distance and screening between identified noise sources and proposed amenity spaces.

9.71 The suitability of the application site for residential development was established by showing that appropriate measures can be taken and compliance with relevant criteria achieved.

Site Suitability for Residential Development - Vibration

9.72 The methodologies and guidance given in BS6472 were used to assess whether vibration levels measured during the surveys would affect the suitability of the application site for residential development.

9.73 The suitability was established based on anticipated levels of vibration perceptibility, which was calculated through assessment of the vibration dose value (VDV). VDV was calculated using the measured vibration data over the frequency range 0.5 Hz to 80Hz, weighted depending on whether horizontal or vertical vibration.

9.74 The VDV gives predicted doses over 16 hour day and 8 hour night periods, which was then compared to fixed ranges. Where the VDV fell in these ranges, it was determined whether the levels would have 'Low Probability of Adverse Comment', 'Adverse Comment Possible' or 'Adverse Comment Probable'. This was used in turn to establish the suitability of the application site for residential development.

Building Services Plant and Commercial Noise

9.75 Although specific details are not yet known, fixed plant installations and noise generating commercial uses will form part of the completed development. It must therefore be ensured that noise emissions do not adversely affect existing and proposed noise sensitive receptors.

9.76 As specific details of potential noise sources are not currently known, this assessment is limited to setting suitable noise emissions criteria, which future designs should adhere to.

9.77 Noise emissions are typically assessed according to BS4142, which gives methodologies for calculating transmission of noise to noise sensitive receptors. The calculated noise level is then rated, by comparison with the established existing lowest background noise level.

9.78 It should be noted that the requirements of LBC for plant noise, as shown in Table 9.1 and summarised below, are more onerous than the typical recommendations given in BS4142.

- *"Plant noise will need to be designed to at least 10dBA, or 15dBA where the source is tonal, as assessed according to BS4142:2014."*

9.79 By designing commercial uses to the recommendations of BS4142 and plant installations to the requirements of LBC, it can be shown that adverse effects are not expected for existing and proposed receptors. Suitable criteria have therefore been set in the assessment accordingly.

Road Traffic Noise

9.80 Road traffic noise was assessed in terms of the predicted increase in traffic flow due to the proposed development. Predicted traffic flows are considered in terms of their impact on baseline traffic flows and the resultant impact on surrounding noise sensitive receptors.

9.81 The scenarios considered in this assessment for the completed development are as follows:

- Existing Baseline;
- Future Baseline;
- Future Baseline + Proposed Development; and
- Future Baseline + Proposed Development + Cumulative Schemes.

9.82 The existing baseline year is 2016, while the future baseline year is 2024. Data is in the form of Annual Average Weekday Traffic flows (AAWT), which was calculated from peak traffic flow data (see Technical Appendix 9.3).

9.83 For all future scenarios, the predicted traffic flow was assessed in terms of the change relative to the baseline flows, which was then used to calculate an increase in receptor noise levels.

9.84 It is noted that no account was taken of potential increases in rail noise. Even should increases be planned, these are unlikely to affect the outcomes of the assessment, as by way of example, increases of approximately 25 % would result in an imperceptible change in noise levels (<1dB).

Significance Criteria

9.85 In accordance with the generic significance criteria as defined in Chapter 2 of this ES, the overall significance of an adverse or beneficial effect has been calculated in terms of the magnitude of the impact and the sensitivity of the receptor.

Sensitivity of Receptors

9.86 The sensitivity of receptors depends on the use of the building. Typical building types have been grouped in terms of sensitivity, based on the typical internal ambient noise levels for different building uses given in Tables 5 and 5 of BS8233:2014. The determined sensitivities are shown in Table 9.2.

Table 9.2: Sensitivity of Receptors	
Activity	**Sensitivity**
Residential, places of worship/theatres, education/medical facilities	High
Offices, libraries, museums	Medium
Retail premises, other commercial	Low
Industrial, warehouse, storage facilities	Very Low

Magnitude of Impact

9.87 The criteria adopted for magnitude of impact is discussed and established for each assessment topic in the sections below.

Demolition and Construction Plant Noise

9.88 Guidance is given is BS5228 Part1 to determine the threshold for significance of effects due to construction noise, based on the existing ambient noise level measured on a site. The determination process is outlined in Table E1 of the standard.

9.89 The process first requires that the existing daytime ambient noise level is established at a receptor, rounded to the nearest 5dB. Based on this rounded ambient noise level, a threshold is determined at which "*a significant effect has been deemed to occur*".

9.90 Table E1 of the standard is reproduced in Table 9.3. Based on permissible periods of construction, only daytime thresholds have been deemed relevant to this assessment.

Table 9.3: Demolition and Construction Plant Noise Magnitude of Impact Criteria			
Assessment Category and threshold value period (L_{Aeq})	**Threshold Value, in Decibels (dB)**		
	Category A[A]	**Category B[B]**	**Category C[C]**
Daytime (07:00 - 19:00) and Saturdays (07:00 - 13:00)	65	70	75
Note 1: A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold value for the category appropriate to the ambient noise level.			
Note 2: If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3 dB due to construction activity.			
Note 3: Applied to residential receptors only.			
[A] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values			
[B] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.			
[C] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.			

Suitability of Site for Residential Development – Internal and External Noise

9.91 The suitability of the application site for residential development depends on the recommendations of certain standards and good practice documents being achievable. Where the most stringent recommendations can be met, this would be considered as a 'very low' magnitude of impact.

9.92 Internal ambient noise levels for proposed residential properties have been assessed and considered in accordance with BS8233:2014. An extract of Table 4 of the document relevant for residential development is reproduced in Table 9.4 and have been adopted for this assessment as the target internal noise criteria.

Table 9.4: Completed Development Indoor Ambient Noise Levels in Dwellings			
Activity	**Location**	**07:00 to 23:00**	**23:00 to 07:00**
Resting	Living room	35dB LAeq, (16hour)	-
Dining	Dining room / area	40dB LAeq, (16hour)	-
Sleeping (Daytime resting)	Bedroom	35dB LAeq, (16hour)	30dB LAeq, (8hour)

9.93 BS8233:2014 goes on to recommend that for noisy sites where development is considered desirable, the above thresholds could be increased by 5dB, with internal conditions still considered reasonable.

9.94 The latest revision of the document does not include a recommended maximum internal noise level. However, in order to provide a suitably robust assessment, the guidance of the previous document (1999 revision) will be used, which is based on WHO recommendations.

9.95 BS8233:1999 states that for reasonable standards in a bedroom at night, individual noise events should not normally exceed a maximum noise level L_{Amax} of 45 dB(A).

9.96 The guidance of BS8233:2014 with regard to external amenity spaces is as follows:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."

9.97 Based on the above guidance, thresholds for magnitude of impact relating to noise in external amenity spaces adopted for this assessment are shown in Table 9.5.

Table 9.5: Completed Development External Amenity Spaces Magnitude of Impact Criteria	
Ambient Noise Level in Amenity Space, $L_{Aeq,T}$	**Proposed Magnitude of Impact**
< 50 dB(A)	Very Low
51 - 55 dB(A)	Low
56 - 60 dB(A)	Medium
> 60 dB(A)	High

9.98 It should be noted that as the application site is in an area considered to be representative of a 'city centre' and 'adjoining the strategic transport network', it may be appropriate to target ambient noise levels that are as low as practicably possible, without unreasonably restricting the development as a whole.

Suitability of Site for Residential Development - Vibration

9.99 The vibration assessment considers measured vibration at two locations across the application site, with the frequent passing of railway traffic established as the primary source of vibration.

9.100 VDV have been used to assess the severity of ambient vibration. Measured and predicted VDV have been compared with Table 3 within BS 6472 to give a probability of adverse comment. Table 3 is reproduced in Table 9.6.

Table 9.6: Completed Development Vibration Magnitude of Impact Criteria (Table 3: BS 6472)

Place and time	Low probability of adverse comment ($ms^{-1.75}$)	Adverse comment possible ($ms^{-1.75}$)	Adverse comment probable ($ms^{-1.75}$)
Residential buildings (16-hour day)	0.2 - 0.4	0.4 - 0.8	0.8 – 1.6
Residential buildings (8-hour night)	0.1 - 0.2	0.2 - 0.4	0.4 – 0.8

Building Services Plant and Commercial Noise

9.101 BS4142 gives methodologies to predict noise emission levels due to commercial noise sources and rate these according to comparison with existing lowest background noise levels at the application site.

9.102 BS4142 states that a noise rating 5dB above the lowest background noise level is likely to be an indication of an adverse impact. If the difference is 10dB or more, then this is stated as likely to be an indication of a significant adverse impact. Where the rating level does not exceed the lowest background noise level, this is stated as an indication of the sound source having a low impact.

9.103 Based on these recommendations, the magnitude of impact criteria that have been adopted for the assessment of commercial and plant noise emissions are shown in Table 9.7.

Table 9.7: Completed Development Commercial and Plant Noise Magnitude of Impact Criteria

Noise Rating Level (Relative to Existing Background Noise)	Stated Indication in BS4142	Magnitude of Impact Criteria
< -5 dB	-	Very Low
< 0 dB	Indication of the sound source having a low impact	Low
< +5 dB	Indication of an adverse impact	Medium
< +10 dB	Indication of a significant adverse impact	High
> +10 dB	-	Very High

9.104 As shown in Table 9.1, the requirement for plant noise emissions as stated in consultation with LBC is as follows:

"Plant noise will need to be designed to at least 10dBA, or 15dBA where the source is tonal, as assessed according to BS4142:2014."

9.105 In demonstrating compliance with the requirements of LBC, noise emissions from plant units would inherently be classed as having a 'Very Low' impact.

Road Traffic Noise

9.106 In order to assess the effects of traffic noise associated with the completed development, the significance matrix given in DMRB has been used. DMRB establishes the predicted increase in noise levels due to increases in traffic flow over time, which is in turn assigned a magnitude rating for receptors in the area.

9.107 For completed development traffic, the matrix for long term traffic increase is deemed relevant. The long-term traffic increase matrix taken from DMRB is summarised in Table 9.8, with Column 3 showing the proposed magnitude of impact rating for each change.

Table 9.8: Completed Development Traffic Noise Magnitude of Impact Criteria

Change in Noise Level, dB(A)	Magnitude of Impact DMRB Long–Term Classification	Magnitude of Impact Criteria
0	No change	Very Low
0.1 - 2.9	Negligible	Low
3 – 4.9	Minor	Medium
5 – 9.9	Moderate	High
10+	Major	Very High

Significance of Effects

9.108 Magnitude of impact and sensitivity of receptor criteria have been combined to determine the overall significance of effects as shown in Table 9.9. The effects can be either adverse or beneficial, depending on the receptor assessed and the nature of the effect. The assessment identifies whether the effects are beneficial or adverse for each receptor along with the significance.

Table 9.9: Significance of Effects

Sensitivity	Magnitude				
	Very High	High	Medium	Low	Very Low
High	Major	Moderate	Minor	Minor	Negligible
Medium	Moderate	Minor	Minor	Negligible	Negligible
Low	Minor	Minor	Negligible	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible	Negligible

9.109 For the purposes of this assessment, any effect above minor (e.g. moderate or major) could be considered to be significant in EIA terms. However, this has been informed by professional judgement and have been informed by whether all practicable means have been adopted to minimise effects, and whether the effect is temporary or permanent.

9.110 Where noise and vibration can be shown to comply with the recommendations of British and WHO Standards, good practice documents or LBC criteria, the effects are considered Negligible.

Assumptions and Limitations

9.111 The current demolition and construction programme does not provide detailed operations at this stage. In addition, exact plant type, percentage on times, quantities and simultaneous operations are not available. Considering the above variables, it would not be possible to predict likely levels of noise and vibration and propagation to receptors. Therefore, a review of the proposed CMP and BPM has been undertaken, based on experience of similar scale developments and professional judgement.

Baseline Conditions

Current Baseline

Existing Noise Environment

9.112 The application site is in a busy urban location with numerous noise sources in the immediate vicinity. It is adjacent to the popular tourist location of Camden Market, which is operational seven days of the week and closes relatively late. There are identified late-night music venues in the area. Several railway lines pass adjacent to the application site, heavily used by both passenger and freight trains. Road traffic noise

from the surrounding local road network also contributes to the ambient noise environment across the application site.

9.113 Measured noise surveys were undertaken across the application site over a period of seven days. Four continuous noise survey locations were used. The first location (BG1) was at the PFS parcel exposed to road traffic noise from Chalk Farm Road and noise from nearby entertainment venues. The second location (BG2) was located on the northern boundary of the proposed superstore in close proximity to the railway at the northern side of the proposed development. The third location (BG3) was chosen to account for noise from the railway tracks on the southern side of the application site. The fourth location (BG4) was located adjacent to Juniper Crescent at the western side of the application site.

9.114 The ambient noise profile was observed to be dominated by railway traffic noise during visits to site during the week. However, monitoring location were chosen to ensure noise emissions from late night entertainment venues, such as Proud Camden among others, were also encapsulated by the surveys.

9.115 The results of the noise surveys are summarised in Table 9.10. Full details of the measurements and results can be found in Technical Appendix 9.2.

Table 9.10: Summary of Noise Survey Measurements

Monitoring Point Reference and Location	Daytime Noise L_{Aeq}(16hour) (dB)	Night Time Noise L_{Aeq}(16hour) (dB)
BG1 – PFS parcel, Chalk Farm Road	69.3	66.2
BG2 – North of the MS parcel, towards northern rail line	66.8	68.3
BG3 – West boundary of MS parcel, towards Juniper Crescent	70.2	63.9
BG4 – Southern boundary of MS parcel, towards southern rail line	63.6	58.5

9.116 Comparing these values with the guidance of Policy DP28, demonstrates that noise levels in all areas of the proposed development would need attenuation measures to be applied.

9.117 Night-time noise levels at location 2 are such that planning permission would not normally be granted. However, it should be noted that location 2 is closer to the railway than any proposed sensitive facade. Based on the additional distance separation and the use of suitable mitigation measures, the assessment demonstrates that suitable internal ambient noise levels would be achievable.

Existing Vibration Environment

9.118 A vibration meter with a vibration dose value module was set up at locations approximately equivalent to the nearest proposed residential properties to the railway and road, as shown in Figure 9.1. The meter was set to measure and calculate the vibration dose value in three axes during the course of the day and night. Table 9.11 summarises the vibration dose value in three axes experienced during the survey.

Table 9.11: Summary of Vibration Dose Value Measurements

Measurement Location	Time Period	Axis	Vibration Dose Value (VDV) $ms^{-1.75}$
Location 3	Daytime average (16 hour)	X	0.15
		Y	0.18
		Z	0.37
	Night time average (8 Hour)	X	0.01
		Y	0.02
		Z	0.08

Table 9.11: Summary of Vibration Dose Value Measurements

Measurement Location	Time Period	Axis	Vibration Dose Value (VDV) $ms^{-1.75}$
Location 4	Daytime average (16 hour)	X	0.15
		Y	0.25
		Z	0.14
	Night time average (8 Hour)	X	0.005
		Y	0.009
		Z	0.007

Sensitive Receptors

Existing Sensitive Receptors

9.119 The baseline section confirms the noise sensitive receptors that may be affected by the proposed development. These are summarised in Table 9.12. Sensitivities have been determined based on the guidance summarised in Table 9.2.

Table 9.12: Summary of Identified Existing Receptors

ID	Receptor	Type	Sensitivity
1	Michael Nadra Primrose Hill	Restaurant	Low
2	Gloucester Ave	Residential	High
3	Gilbeys Yard	Residential	High
4	APTN (Associated Press Television News)	News Station	High
5	Camden Market	Commercial	Low
6	Chalk Farm Road	Residential	High
7	Proud Camden	Cabaret/Theatre	High
8	Juniper Crescent	Residential	High
9	Round House	Theatre	High

9.120 Identified receptors are also shown by location in Figure 9.2.

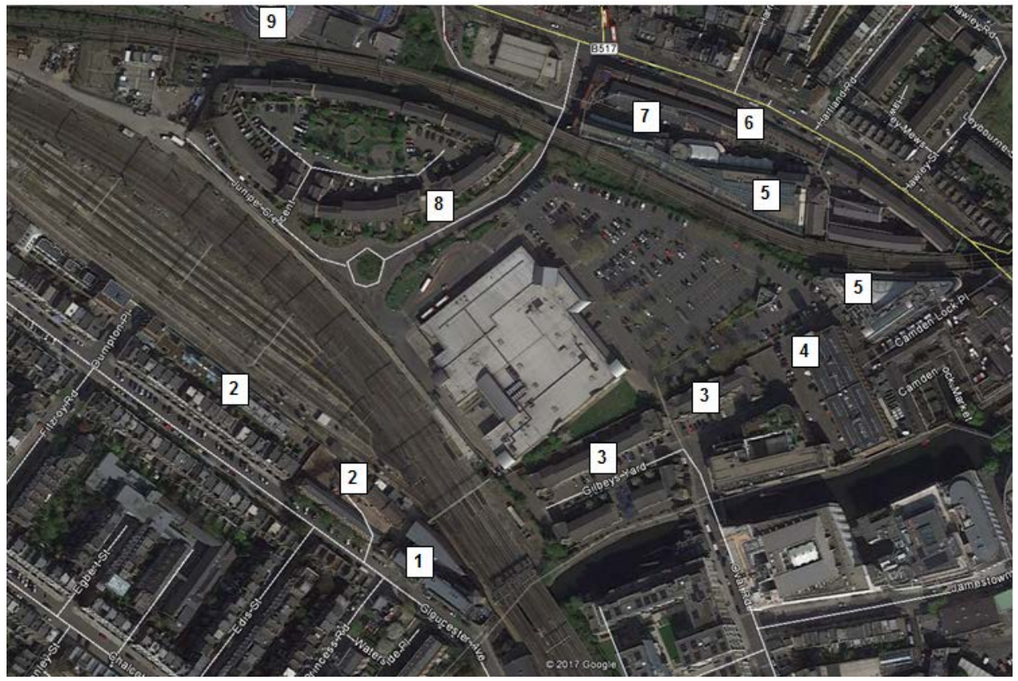

Figure 9.2: Location of Sensitive Receptors

New Sensitive Receptors

9.121 The application site is proposed to be developed for residential dwellings, as well as commercial and retail uses. New sensitive receptors would consist of:

- New residents (high sensitivity) of the proposed development;
- New commercial premises (low sensitivity) built as part of the proposed development; and
- Public and private amenity spaces (high sensitivity) delivered as part of the proposed development.

9.122 Cumulative developments in the area would not introduce any sensitive receptors closer to the application site than currently existing. As shown in Figure 9.2, the closest receptors are 3, 4 and 5, all rated as having 'high' sensitivity.

Potential Impacts and Likely Effects

Demolition and Construction

Phasing

9.123 As stated in Chapters 2 and 5, the sequencing of activities on-site would be as follows:

- PFS parcel Enabling, Demolition, Construction of PFS Block and Fit Out for temporary supermarket use at ground floor and offices above; MS parcel fully operational;
- PFS parcel operational as temporary supermarket and office use (on-site receptors); MS parcel Enabling, Demolition and Construction of Blocks A,B,C; and
- PFS parcel conversion of PFS Block from temporary supermarket to a PFS; MS parcel supermarket operational, Blocks B and C near complete with Blocks A, D, E1, E2 and F under construction.

9.124 A detailed demolition and construction programme, specific plant data and operations are not available at this stage of the planning programme. However, reasonable predictions of likely operations and the resultant noise levels have been made based on the information provided in ES Chapter 5: Demolition and Construction.

9.125 In addition, account has been taken of the best practice measures that would be adopted and implemented by the Applicant, as described in ES Chapter 5: Demolition and Construction, including the implementation of BPM and a CMP.

Demolition and Construction Plant Noise

9.126 To assess the limits for reasonable construction noise experienced at the nearest receptors, Table E.1 from BS5223 Part 1, as reproduced in the preceding Assessment Methodology section of this chapter has been used. The nearest NSRs for each stage have been identified as follows:

- Phase 1: Receptors 7 and 9 (sensitivity 'high');
- Phase 2: Receptors 3, 4, 8 (sensitivity 'high'), on-site offices at PFS parcel (sensitivity 'low'); and
- Phase 3: All of the above as well as occupied units of early completed phases.

9.127 Existing ambient noise levels have been assessed for each NSR, with the guidance summarised in Table 9.3 used to set a suitable demolition and construction noise threshold. These proposed threshold levels are shown in Table 9.13. All identified receptors haven been classed as having high sensitivity to construction noise.

Table 9.13: Proposed Demolition and Construction Noise Thresholds

Receptor	Phases Affected	Type	Representative Ambient Noise Level, Rounded to 5dB	Proposed Threshold, According to BS5228 Part 1
3	2 and 3	Residential	65 dB(A) (Position 4)	70 dB(A)
4	2 and 3	News Station	65 dB(A) (Position 4)	70 dB(A)
7	1 and 3	Cabaret/Theatre*	70 dB(A) (Position 1)	75 dB(A)
8	2 and 3	Residential	65 dB(A) (Position 4)	70 dB(A)
9	1 and 3	Theatre*	70 dB(A) (Position 1)	75 dB(A)

*These receptors would only be sensitive during hours of operation. Where construction activities can be timed outside of theatre opening hours, a higher level of noise may be permissible.

9.128 Chapter 5: Demolition and Construction outlines a framework CMP, which would be implemented as part of works. The framework CMP would be designed to minimise the adverse effects on surrounding receptors, including effects due to noise and vibration. It would also include strategies to minimise the breakout of construction noise,

9.129 Chapter 5 also lists BPM, which would be implemented prior to works commencing. Relevant parts of this are as follows:

- Careful selection of demolition and construction methods and plant used to minimise at source as far as reasonably practical;
- Using electric and electro-hydraulic plant and equipment where practical;
- Switching off engines when not in use;
- Using of acoustic barriers where appropriate;
- Using non-percussive tools and equipment where practical;
- Planning all mass concreting operations for weekends whenever possible;
- Parking construction traffic off the public highway;
- Controlling the discharge of trucks from site to avoid congestion;

- Implementing traffic management systems at the entrances to the application site at all times to control the traffic into the application site;
- Planning deliveries and removals out of peak hours as far as possible;
- Maintaining a minimum 2.4 m high hoarding around the site boundary to screen noise from low level sources and/or street level receptors;
- Using 'silenced' plant and equipment wherever possible and maintaining/servicing plant on a regular basis and ensuring these would be certified to meet relevant current legislation and BS5228 standards;
- Operating plant at low speeds where possible and incorporating automatic low speed idling;
- Siting noisy activities away from sensitive receptors, where possible;
- Temporarily screening or enclosing static noisy plant to reduce noise emissions and certifying plant to meet relevant standards;
- Implementing noise monitoring to accord with maximum levels set out in the ES;
- Minimising disturbance from reversing bleepers through measures such as site layout, provision of screening or use of broadband sound emitting reversing alarms;
- Switching off vehicle engines where vehicles are standing for an extended period of time;
- Lowering materials whenever practicable rather than dropping;
- Making all contractors familiar with the guidance in BS 5228[21] and BS 7385[22] which would form a pre-requisite of their appointment.

9.130 Also stated in Chapter 5 is a commitment to form a Section 61 Agreement with LBC, which would include the hours, methods, predicted plant, restrictions and noise predications for proposed demolition and construction works. At this stage, a detailed prediction of noise levels at identified receptors can be undertaken. Based on the high level of ambient noise measured in the area, no overly restrictive mitigation measures would be expected.

9.131 As shown in both the CMP and BPM, provision has been made for noise monitoring during demolition and construction works. Monitoring would be undertaken for both on-site receptors of completed phases and off-site receptors. By using the thresholds proposed in Table 9.13 as action values for this noise monitoring, it can be ensured that construction noise does not exceed a level at which a significant effect is deemed to occur. In this way, construction noise can be limited to a direct, short term and temporary, **Minor Adverse** effect at the closest off-site noise sensitive receptors (NSRs) and on-site NSRs, with temporary **Negligible Adverse** effects at all other receptors.

Demolition and Construction Traffic

9.132 For demolition and construction stage traffic, assessment has been undertaken of the provided traffic flows according to short-term criteria, which show the predicted change in traffic flow relative to the current (2016) and future (2024) baseline. The traffic flows are presented in full in Appendix 9.3.

9.133 It should be noted that it is accepted that the current and future baselines (without the development and without cumulative schemes) show no change in traffic flows. These are therefore the same values.

9.134 The calculated noise changes due to predicted changes in traffic flows are shown in Table 9.14. Based on the nature of the majority of surrounding receptors, all areas have been assessed as 'high' sensitivity.

Table 9.14: Effects of Construction Noise Traffic

Link	Sensitivity	Calculated Noise Difference	Impact Magnitude	Calculated Significance of Effect
Chalk Farm Road (East)	High	< 0.1dB	Very Low	Negligible
Chalk Farm Road (West)	High	< 0.1dB	Very Low	Negligible
Juniper Crescent	High	< 0.1dB	Very Low	Negligible
Ferdinand Street	High	< 0.1dB	Very Low	Negligible

9.135 As shown in Table 9.14, the expected effect due to construction traffic noise would be **Negligible Adverse** at all receptors.

Demolition and Construction Vibration

9.136 As part of establishing a Section 61 Agreement with LBC, details will be provided of proposed plant and techniques to be used, at which point predictions can be made of anticipated vibration levels at receptors.

9.137 When undertaking vibration monitoring during demolition and construction works, a limit of 1 mm/s PPV would be set as an action level. In this way, the effects at off-site receptors due to vibration would be limited to direct, short term, **Minor Adverse** effects.

9.138 The same monitoring and criteria would also be applied to on-site receptors of completed phases, in order to ensure the effects on these receptors are similarly limited to **Minor Adverse**.

9.139 Vibration is particularly short term in nature. Provided BPM are implemented, any more onerous requirements could be unduly restrictive on construction works.

Completed Development

Site Suitability – Internal Noise

9.140 As shown in Table 9.10, the application site experiences similar ambient noise levels at locations 1, 2 and 3, with a noted drop in levels towards location 4 at the south of the application site.

9.141 Calculations have been undertaken, incorporating daytime and night-time ambient noise levels, as well as 'not normally exceeded' maximum night-time noise levels in line with BS8233: 1999.

9.142 Calculations have considered the baseline, measured noise data, corrected to account for predicted changes in traffic flows, and the positioning of residential spaces around the proposed development.

9.143 Baseline measured data incorporates measured noise levels due to rail traffic, road traffic and identified existing commercial uses, including Proud Camden and The Round House.

9.144 All residential units are proposed to have mechanical ventilation. This would maximise the performance of the external facade and glazing, as penetrations through the building facade would be minimised.

9.145 For outward facing residential windows close to locations 2 and 3, high performance acoustic double glazing in conjunction with a mechanical ventilation system would achieve the target/required internal levels.

9.146 For inward facing windows, or windows close to location 4, standard acoustic double glazing in conjunction with the proposed mechanical ventilation system would be capable of achieving the target/required internal levels.

9.147 Full detailed specifications for each building facade are shown in Appendix 9.6.

[21] British Standards Institution, 2009. BS 5228:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites. BSI.

[22] British Standards Institution, 1993. BS 7285:1993 Evaluation and Measurement for Vibration in Buildings. Guide to Damage Levels from Groundborne Vibration. BSI

9.148 It should be noted that the above assessment is for habitable rooms (bedrooms and lounges) only. For less sensitive spaces such as hallways, bathrooms and kitchens (not with an open plan lounge), a lower level of acoustic performance would be acceptable.

9.149 Through the successful implementation of glazing and ventilation strategies, the effects of noise on internal ambient residential noise levels would be **Negligible**.

Site Suitability - External Noise

9.150 As shown in Table 9.10, existing daytime ambient noise levels on the application site are above the region classed as having a high impact magnitude

9.151 Detailed calculations have been undertaken for proposed locations of communal amenity space and private gardens as shown in Appendix 9.4. These calculations confirm the following noise levels:

- Block A Courtyard: L_{Aeq} 54 dB(A);
- Block B Level 2 Central Courtyard: L_{Aeq} 50 dB(A);
- Block C Roof Garden: L_{Aeq} 51 dB(A);
- Block D Private Rear Gardens: L_{Aeq} 47 dB(A);
- Block E1 Rear Garden Space: L_{Aeq} 55 dB(A);
- Block E2 Private Rear Gardens: L_{Aeq} 57 dB(A);
- Block F Central Courtyard: L_{Aeq} 47 dB(A); and
- PFS Block Winter Garden: L_{Aeq} 53 dB(A).

9.152 As shown in the levels above, by provided communal amenity space and private gardens, residents would have access to an external amenity space with **Negligible** to **Minor Adverse** ambient noise levels.

9.153 For private balconies on outward facing facades, ambient noise levels would range from L_{Aeq} 48 dB(A) and central, inward facing balconies, to L_{Aeq} 67 dB(A) at Block A balconies overlooking Position 3 on the southwest side. Users of these balconies would therefore experience **Negligible** to **Moderate Adverse** effects.

9.154 As detailed in BS8233:2014, ambient noise levels in external amenity space should not prohibit development on city centre sites close to the strategic transport network. By including amenity space on inward facing parts of the proposed development, it is considered that practicable measures are being undertaken, and all residents would have access to a quieter shared amenity space. Accordingly, this effect is not considered to be significant.

Building Services Plant and Commercial Noise

9.155 Noise emissions from building services plant and commercial noise could affect both the closest existing off-site and new on-site receptors.

9.156 For commercial noise such as noise generated from the delivery schedule, lift trucks, any reverse alarm and noise break-out from the other proposed uses, the noise rating level should not exceed the background noise level.

9.157 For plant noise emissions, LBC has stipulated that the noise rating level should be 10-15 dB below background noise, depending on tonality.

9.158 Table 9.15 shows proposed noise emissions criteria for plant noise and commercial noise, based on the above.

Table 9.15: Proposed Plant and Commercial Noise Thresholds

Receptor	Period	Representative Background Noise Level $L_{A90,T}$	Proposed Criterion for Plant Noise Emissions	Proposed Criterion for Commercial Noise Emissions
3	Daytime	43 dB(A)	28-33 dB(A)	43 dB(A)
	Night-time	38 dB(A)	23-28 dB(A)	38 dB(A)
4	Daytime	43 dB(A)	28-33 dB(A)	43 dB(A)
	Night-time	38 dB(A)	23-28 dB(A)	38 dB(A)
7	Daytime	61 dB(A)	46-51 dB(A)	61 dB(A)
	Night-time	46 dB(A)	31-36 dB(A)	46 dB(A)
8	Daytime	43 dB(A)	28-33 dB(A)	43 dB(A)
	Night-time	38 dB(A)	23-28 dB(A)	38 dB(A)
9	Daytime	61 dB(A)	46-51 dB(A)	61 dB(A)
	Night-time	46 dB(A)	31-36 dB(A)	46 dB(A)

9.159 Although full details of proposed fixed plant installations are not currently known, it is anticipated, based on experience, that LBC's noise rating levels would be secured by means of an appropriately worded planning and that any installation would be designed to meet the LBC criteria.

9.160 Considering embedded mitigation only, it is likely that **Minor Adverse** long-term plant noise effects could arise at the closest off-site receptors and on-site receptors. Similarly **Minor Adverse** long-term commercial noise effects could arise.

Traffic Noise at Surrounding Receptors

9.161 For completed development traffic flow effects, the assessment has been undertaken according to long-term traffic flow criteria, which show the predicted change in traffic flow relative to the current (2016) and future (2024) baseline.

9.162 It should be noted that it is accepted that the current and future baselines (without the development and without cumulative schemes) show no change in traffic flows. These are therefore the same values.

9.163 The scenarios assessed are as follows:

- Current and Future Baseline (for reference),
- Future Baseline + Proposed Development (Completed Development).

9.164 The calculated noise changes due to predicted changes in traffic flows are shown in Table 9.16. Based on the nature of the majority of surrounding receptors, all areas have been set as 'high' sensitivity.

Table 9.16: Effects of Completed Development Traffic

Link	Sensitivity	Calculated Noise Difference	Impact Magnitude	Calculated Significance of Effect
Chalk Farm Road (East)	High	< 0.1dB	Very Low	Negligible
Chalk Farm Road (West)	High	< 0.1dB	Very Low	Negligible
Juniper Crescent	High	< 0.1dB	Very Low	Negligible
Ferdinand Street	High	< 0.1dB	Very Low	Negligible

9.165 As shown in Table 9.16, the expected effect due to completed development traffic noise would be **Negligible** at all receptors.

Vibration

9.166 As shown in Table 9.11, the measured VDV dose levels in all axes, at all measurement positions are within or below the range specified as 'low possibility of adverse impact'.

9.167 The effect of vibration on proposed residential receptors would therefore be long term, **Negligible** to **Minor Adverse**.

Mitigation and Residual Effects

Demolition and Construction

Demolition and Construction Noise

9.168 No additional mitigation measures are deemed necessary, based on the proposed CMP and BPM. These both allow for monitoring during the demolition and construction works. Criteria have been proposed in this chapter to ensure that through ongoing monitoring and reaction to trigger levels, the residual noise effect from construction activities is limited to a direct, short term, **Minor Adverse** effects at on-site and the closest off-site receptors. Effects for all other receptors would be **Negligible Adverse**.

9.169 Furthermore, allowance has been made for a Section 61 Agreement. At the detailed construction planning stage, detailed predictive calculations would be undertaken, to ensure appropriate mitigation measures are used during the construction phase.

Demolition and Construction Traffic Noise

9.170 No mitigation is deemed necessary above the proposed CMP and BMP. On this basis, the residual demolition and construction traffic effects would be **Negligible** at all receptors.

Demolition and Construction Vibration

9.171 No additional measures are deemed necessary, based on the proposed CMP and BPM. These both allow for monitoring during construction works. Criteria would be proposed in the CMP to ensure that through ongoing monitoring and reaction to trigger levels, the residual vibration effect from construction activities would be limited to a direct, short term, **Minor Adverse** impact at on- and off-site receptors.

Completed Development

Site Suitability - Internal Noise

9.172 The proposed glazing and ventilation strategies discussed in this assessment and detailed in Appendix 9.5 would be implemented for noise sensitive living spaces. On this basis, no additional mitigation would be required and the residual effect would be **Negligible**.

Site Suitability - External Noise

9.173 Calculations have shown that noise levels across shared amenity spaces and private gardens would range from L_{Aeq} 47 dB(A) to L_{Aeq} 57 dB(A). No additional mitigation is required and therefore the residual effect would be **Negligible** to **Minor Adverse**.

9.174 Private balcony amenity spaces of the proposed development would be subject to **Negligible** to **Moderate Adverse** effects due to ambient noise levels, although this is not considered to be prohibitive to the proposed development and the effects not significant. On this basis, no additional mitigation is required.

9.175 No further mitigation is therefore recommended.

Building Services Plant Noise and Commercial Noise

9.176 In respect of plant noise, the following mitigation would be considered in the plant installation design:

- Selecting plant units with as low noise emissions as is practicable;
- Appropriate siting of plant units (e.g. away from noise sensitive receptors; within the building envelope where possible);
- Use of silencers within ducted plant installations;
- Use of plant rooms / enclosures, with ventilation provided by attenuating louvres; and
- Use of screening.

9.177 Taking into consideration these measures, together with compliance with the LBC criteria, the residual plant noise effects would be **Negligible**. The additional mitigation would be secured by means of appropriately worded planning conditions.

9.178 In respect of commercial use, the following mitigation would be considered during the detailed design:

- Limiting the noise level at source, e.g. through use of a noise limiter;
- Zoning of commercial layout to minimise external facades to noisy activities;
- Design of building facades to effectively contain noise emissions, e.g. acoustic glazing and doorsets, lobbied entrances; and
- Time restraints to limit noise emissions during sensitive times of the day and night.

9.179 Taking into consideration these measures, together with compliance with the LBC criteria, the residual commercial noise effects at the closest off-site and at on-site receptors would be **Minor Adverse**. The additional mitigation would be secured by means of appropriately worded planning conditions.

Traffic Noise

9.180 There would be a negligible increase in road noise due to traffic flows from the proposed development. No mitigation measures are proposed and the residual effects would therefore be **Negligible**.

Internal Vibration Levels

9.181 No further mitigation measures are proposed. Measured vibration levels would be **Negligible** to **Minor Adverse**. Residual effects would be **Negligible** to **Minor Adverse**.

Summary of Mitigation and Residual Effects

9.182 Table 9.17 and Table 9.18 provide a tabulated summary of the outcomes of the Noise and Vibration Impact Assessment of the proposed development.

Table 9.17: Summary of Proposed Mitigation and Enhancement Measures

Likely Effects Identified	Proposed Mitigation / Enhancement Measures
Demolition and Construction	
Generation of demolition and construction plant noise	No mitigation required.
Generation of demolition and construction traffic noise	No mitigation required.
Generation of demolition and construction vibration	No mitigation required.

Table 9.17: Summary of Proposed Mitigation and Enhancement Measures

Likely Effects Identified	Proposed Mitigation / Enhancement Measures
Completed Development	
Effect of existing noise environment on internal residential noise levels	No mitigation required.
Effect of existing noise environment on external amenity spaces	No mitigation required.
Change in road traffic noise at off-site receptors.	No mitigation required.
Plant noise on existing and proposed on-site sensitive receptors	Appropriate limits to be set and best practice design to be delivered by means of an appropriately worded planning condition.
Commercial noise on existing and proposed on-site sensitive receptors	Appropriate limits to be set and best practice design to be delivered by means of an appropriately worded planning condition.
Effect of existing vibration levels on dwellings	No mitigation required.

Table 9.18: Summary of Residual Effects

Receptor	Description of Residual Effect	Nature of Residual Effect*					
		Significance**	+ -	D I	P T	R IR	St Mt Lt
Demolition and Construction							
Closest on and off-site (3, 4, 7, 8, 9) receptors	Generation of demolition and construction plant noise	Minor	-	D	T	R	St
All other NSR	Generation of demolition and construction plant noise	Negligible	-	D	T	R	St
Off-site NSRs	Generation of demolition and construction traffic noise	Negligible	-	D	T	R	St
Closest off-site and on-site NSRs	Generation of demolition and construction vibration	Minor	-	D	T	R	St
Completed Development							
On-site residential receptors	Effect of existing noise environment on internal residential noise levels	Negligible	N/A	D	P	R	Lt
On-site residential receptors	Effect of existing noise environment on proposed external amenity spaces	Negligible to Moderate	-	D	P	R	Lt
Off-site NSRs	Change in road traffic noise levels.	Negligible	-	D	P	R	Lt
Closest off-site and on-site NSRs	Generation of plant noise.	Negligible	N/A	D	P	R	Lt

Table 9.18: Summary of Residual Effects

Receptor	Description of Residual Effect	Nature of Residual Effect*					
		Significance**	+ -	D I	P T	R IR	St Mt Lt
Closest off-site and on-site NSRs	Generation of commercial noise	Minor	-	D	P	R	Lt
On-site residential receptors	Effect of existing vibration levels on proposed development	Negligible to Minor	-	D	P	R	Lt

Notes:
* - = Adverse/ + = Beneficial; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St- Short term/ Mt –Medium term/ Lt –Long term.
**Negligible/Minor/Moderate/Major

Likely Significant Environmental Effects

9.183 There are no likely significant environmental effects. The moderate adverse effects of noise on worst affected private balconies is recommended as being offset by the provision of quieter shared amenity space, associated with all residential blocks.

Cumulative Effects

9.184 The list of cumulative schemes as presented in Table 2.1 and presented in Figure 2.1 of ES Chapter 2: EIA Process and Methodology was considered in undertaking this assessment. Associated traffic flows are as presented in Appendix 9.3.

Demolition and Construction

Demolition and Construction Plant Noise

9.185 Based on the level of ambient noise measured at the application site, the effects of construction noise due to cumulative schemes would be effectively masked by the existing noise due to railway traffic, road traffic and commercial uses.

9.186 It is anticipated that cumulative schemes would have provision for similar mitigation measures as detailed in Chapter 5: Demolition and Construction, targeted at avoiding significant effects at the on-site receptors associated with the proposed development, as well as identified existing receptors. Accordingly, the residual cumulative plant noise effects would be **Negligible** to **Minor Adverse** in the worst case.

Demolition and Construction Traffic Noise

9.187 Based on review of the cumulative traffic flows and as the application site is bounded by railways with corresponding moderate to high levels of ambient noise, it is unlikely that changes in traffic flows for cumulative scenario would have a noticeable effect for on-site receptors. Accordingly the cumulative construction traffic would have a **Negligible** effect.

Demolition and Construction Vibration

9.188 It is anticipated that cumulative schemes would have provision for similar mitigation measures as detailed in Chapter 5: Demolition and Construction, targeted at avoiding significant vibration effects at the on-site receptors associated with the proposed development, as well as identified existing receptors. Accordingly, the residual cumulative vibration effects would be o **Minor Adverse** in the worst case.

Completed Development

Site Suitability for Residential Development – Internal and External Noise

9.189 The assessments undertaken earlier in this chapter have taken cumulative schemes into account, with noise data used in calculations manipulated to account for the proposed development and cumulative schemes.

Road Traffic Noise

9.190 The effects of traffic flow changes on existing and off-site receptors have been calculated using the following scenarios:

- Current and Future Baseline (for reference),
- Future Baseline + Proposed Development (Completed Development) + Cumulative Schemes.

9.191 The calculated noise changes due to predicted changes in traffic flows are shown in Table 9.19. Based on the nature of the majority of surrounding receptors, all areas have been set as 'high' sensitivity.

Table 9.19: Proposed Construction Noise Thresholds

Link	Sensitivity	Calculated Noise Difference	Impact Magnitude	Calculated Significance of Effect
Chalk Farm Road (East)	High	0.2 dB	Low	Minor
Chalk Farm Road (West)	High	0.2 dB	Low	Minor
Juniper Crescent	High	1.0 dB	Low	Minor
Ferdinand Street	High	0 dB	Very Low	Negligible

9.192 As shown in Table 9.19, the expected cumulative effect due to completed development and cumulative scheme traffic noise is **Negligible** to **Minor Adverse** at all receptors.

Summary

Background

9.193 An assessment of the predicted impact due to noise and vibration associated with the proposed development has been undertaken, in order to predict likely effects, identify any necessary mitigation and set appropriate criteria, such that the design can be progressed to protect against significant adverse effects.

9.194 The assessment has considered relevant legislation, together with regional and local policies, national standards and good practice guides relevant to noise and vibration. Consultation responses from LBC have also been taken into account in undertaking the assessment.

9.195 A noise and vibration measurement procedure was designed and agreed with LBC, which comprised week long noise monitoring at four positions across the application site and 48-hour vibration surveys at two locations.

9.196 The surveys established that both noise and vibration in the area is dominated by railway noise with trains passing on either side of the application site, to the east and west. Contributions of noise were also noted from road traffic noise and late-night entertainment venues in the area.

Demolition and Construction

9.197 A review of Chapter 5: Demolition and Construction has been undertaken, which comprises a framework CMP and use of BPM. These measures include allowance for the preparation of a Section 61 Agreement with LBC, as well as proposals for demolition and construction noise and vibration monitoring during works.

9.198 Through the calculations of suitable criteria, noise from demolition and construction works would be limited to a **Minor Adverse** effects at all nearby noise sensitive receptors and **Negligible Adverse** effects at all other noise sensitive receptors.

9.199 Similarly, through the calculations of suitable criteria, vibration from demolition and construction works would be limited to a **Moderate Adverse** effects at the on- and off-site receptors, during worst case temporary periods.

9.200 Traffic flows incorporating demolition and construction traffic have been assessed for the worst-case phase of the proposed development works, and the effects due to construction traffic noise is expected to be **Negligible**.

9.201 Demolition and construction vibration would be monitored, with a limit of 1mm/s PPC set as an action level. This would result in a direct, short term **Minor Adverse** effect.

Completed Development

9.202 A glazing assessment has been undertaken in order to ensure measured ambient noise levels at the proposed development are sufficiently reduced by the building facade to provide a suitable residential environment. Ambient levels have been corrected to account for the predict increase in noise levels due to traffic flows associated with the completed development, as well as cumulative schemes.

9.203 Mechanical ventilation is proposed for all residential spaces. A glazing specification has been proposed which, in combination with mechanical ventilation, would be capable of reducing noise levels in line with the recommendations of BS8233:2014. By demonstrating compliance with this standard, the effects of noise on internal residential spaces would be **Negligible**.

9.204 For external amenity spaces, the only mitigation possible is locating these as far from noise sources as possible, and introducing screening. The proposed development's layout would ensure that all residents would have access to shared amenity spaces, which would be sheltered and therefore affected to a **Negligible** to **Minor Adverse** extent.

9.205 Private balconies would be subject to a **Moderate Adverse** effects due to noise, although residents would have access to a quieter communal amenity space which is in line with the recommendations of BS8233:2014. It is therefore acceptable for private balconies to experience a higher level of noise.

9.206 For building services plant noise, conditions imposed by LBC inherently limit noise emissions to a **Negligible** level. Appropriate criteria have been set in this assessment in order to ensure compliance is achieved once detailed designs are undertaken.

9.207 For commercial noise breakout, appropriate criteria have been set in this assessment to ensure this is limited to a **Minor Adverse** effect on receptors.

9.208 Calculations based on traffic flows have shown that the direct effect of road traffic due to the proposed development is **Negligible** when compared with current and future baseline flows.

9.209 Measured vibration levels would fall in the range of **Negligible** to **Minor Adverse** on the proposed development. The vibration levels would either fall within or below the region stated in the relevant standard as demonstrating 'low probability of adverse comment'.

10 DAYLIGHT, SUNLIGHT, OVERSHADOWING, SOLAR GLARE AND LIGHT POLLUTION

Introduction

10.1 This chapter of the ES assesses the potential impacts and likely effects of the proposed development on the daylight and sunlight availability to neighbouring properties, as well as overshadowing, solar glare and light pollution. The assessment considers four main issues:

- The effect of the proposed development on daylight and sunlight availability at adjacent existing residential properties;
- The effect of the proposed development on levels of sunlight within amenity areas and public open space surrounding the application site;
- The effect of the proposed development on road users and train drivers in respect of potential solar glare; and
- The effect of the proposed office element upon the immediate residential neighbours in respect of light pollution.

10.2 This chapter describes the methods used to assess the potential impacts and likely effects; the baseline conditions currently existing at the application site with its surroundings; the potential daylight, sunlight, overshadowing, solar glare and light pollution impacts during the demolition and construction and the completed stages of the proposed development taking into consideration any relevant embedded mitigation measures; and the significance of the residual effects.

10.3 The assessment has been undertaken in accordance with the relevant policy documents, the Building Research Establishment Guidance, 2011[1]. British Standard 8206 Part 2: Code of Practice for Daylighting, 2008[2] and the Institute of Lighting Practitioners (ILP): The Guidance Notes for the Reduction of Obtrusive Light, 2011.

10.4 In addition, a standalone 'Contextual Density and Daylight Research' report has been produced to accompany the application. This report includes a borough-wide daylight analysis to study the daylight provision in Camden and is drawn upon within the mitigation section of this chapter.

10.5 The chapter is accompanied by the following technical appendices within ES Volume 3A:

- Technical Appendix 10.1: Drawings of Scenarios;
- Technical Appendix 10.2: Daylight and Sunlight Assessment;
- Technical Appendix 10.3: Overshadowing Assessment;
- Technical Appendix 10.4: Solar Glare Assessment;
- Technical Appendix 10.5: Light Pollution Assessment; and
- Technical Appendix 10.6: Internal Daylight and Sunlight Amenity Assessment.

[1] Building Research Establishment, 2011. Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice.
[2] British Standards Institution, 2008. British Standard 8206 Part 2: Code of Practice for Daylighting. BSI.
[3] Her Majesty's Stationery Office (HMSO), 2005. Clean Neighbourhoods and Environment Act, Section 10.

Legislation and Policy Context

10.6 The following sections of this chapter provide a review of relevant legislation, guidance and national, regional and local planning policy requirements in terms of daylight, sunlight, overshadowing and solar glare.

National Legislation and Policy

Clean Neighbourhoods and Environment Act, Section 102, 2005

10.7 Section 79 of the Environmental Protection Act, 1990 as amended by the Clean Neighbourhoods and Environment Act, 2005[3], states the following with regards to light pollution:

10.8 *"Artificial light emitted from premises so as to be prejudicial to health and nuisance constitutes a 'Statutory Nuisance' and it shall be the duty of every local authority to cause its area to be inspected from time to time to detect any statutory nuisances which ought to be dealt with under section 80 [or sections 80 and 80A) and, where a complaint of a statutory nuisance is made to it by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint".*

National Planning Policy Framework, 2012

10.9 The NPPF[4] adopted on 27 March 2012 stipulates that *"…planning policies and decisions should always seek to secure a good standard of amenity for existing and future occupants of land and buildings."*

Planning Practice Guidance, 2014

10.10 Paragraph 026 of the Design guidance within the PPG[5] states that *"account should be taken of local climatic conditions, including daylight and sunlight"*.

Regional Policy

The London Plan Spatial Development Strategy for London Consolidated with Alterations since 2011, 2016

10.11 The key policies from the adopted London Plan[6] of relevance to this assessment are detailed below:

- Policy '7.6 – Architecture' states that "*…buildings and structures should…not cause unacceptable harm to the amenity of surrounding land and buildings, particularly residential buildings, in relation to privacy, overshadowing, wind and micro-climate*."
- Policy '7.7 - Location and Design of tall and large buildings' notes that large buildings should not adversely affect their surroundings in terms of overshadowing and solar reflected glare: *"Location and design of tall buildings should not affect their surroundings adversely in terms of microclimate, wind turbulence, overshadowing, noise, reflected glare, aviation, navigation and telecommunication interference."*

[4] Department for Communities and Local Government, 2012.National Planning Policy Framework. London. HMSO.
[5] https://www.gov.uk/guidance/national-planning-policy-framework
[6] Greater London Authority, 2016. The London Plan Spatial Development Strategy for London Consolidated with Alterations since 2011. London. GLA

Housing Supplementary Planning Guidance, 2016

10.12 The SPG[7] draws on the London Plan, primarily policy '7.6 - Architecture', and provides further guidance on standards to daylight and sunlight.

10.13 The guidance states that *"an appropriate degree of flexibility needs to be applied when using BRE guidelines to assess the daylight and sunlight impacts of new development on surrounding properties, as well as within new developments themselves."*

10.14 It continues *"guidelines should be applied sensitively to higher density development…where BRE advice suggests considering the use of alternative targets' taking in to account the 'local circumstances; the need to optimise housing capacity; and scope for character and form of an area to change over time."*

10.15 It is also stated that *"natural light is also vital to a sense of wellbeing in the home, and this may be restricted in densely developed parts of the city." Housing that provides "comfortable and enjoyable places of retreat and privacy' and factors to be considered include…daylight and sunlight."*

Sustainable Design and Construction Supplementary Planning Guidance, 2014

10.16 Section 2.3 of the SPG[8] provides guidance on key areas such as site layout and microclimate in relation to site layout and building design.

10.17 With regard to site layout, the guidance states that measures to reduce carbon dioxide emissions "*include enabling access to daylight and sunlight for uses that require [light]*." In addition, the guidance states that "*site planning can minimise the impact of the shadow created by the new buildings to protect existing features such as open space and renewable solar technologies on roofs*." It goes on to say that *"developers should ensure the layout of their site and buildings maximises the opportunities provided by natural* systems*, such as light*."

10.18 The SPG continues with effects on the micro-climate caused by new buildings which include *"overshadowing and reducing access to sunlight."*

10.19 The guidance states that the above effects should *"be considered during the design of a development and assessed once the designed is finalised."*

Local Policy

London Borough of Camden Core Strategy and Development Policies Documents 2010-2025, 2010

10.20 The current Local Development Framework for LBC covers the period 2010 to 2025, and comprises the Core Strategy[9] and Development Policies[10]. There are no policies relevant to daylight, sunlight, overshadowing and glare within the Core Strategy.

10.21 Policy 'DP26 - Managing the impact of development on occupies and neighbour' states that the Council will not grant permission for development that affect amenity, in respect of amongst others, daylight, sunlight and artificial light levels.

Camden Planning Guidance 6 - Amenity, 2016

10.22 The key messages within this SPG[11] in relation to daylight and sunlight are that the Council expects *"all buildings to receive adequate daylight and sunlight, daylight and sunlight reports will be required where there is potential to reduce existing levels of daylight and sunlight"*.

10.23 The guidance goes onto state that *"a daylight and sunlight report should assess the impact of the development following the methodology set out in the most recent version of Building Research Establishment's (BRE) 'Site layout planning for daylight and sunlight: A guide to good practice'"*.

10.24 Further in the guidance it states *"as the BRE guidance suggests, the readings will be interpreted flexibly as their aim is to support rather than constrain natural lighting". In addition, it states "daylight is only one of the many factors in site layout design"* and *"when applying these standards in Camden, we will take into consideration other site factors and constraints."*

10.25 In relation to sunlight the guidance states the *"design of your development should aim to maximise the amount of sunlight into rooms without overheating the space and to minimise overshadowing."*

London Borough of Camden Draft Local Plan, 2016

10.26 The Draft Camden Local Plan[12] states that many aspects including daylight and sunlight have a critical impact on health and wellbeing all of which can affect physical and mental health and influence life chances, in relation to delivering high quality accessible homes.

10.27 Policy 'A1 - Managing the impact of development' states that the council "*will seek to protect the quality of life of occupiers and neighbours"* and that permission would be granted for development unless it causes "*unacceptable harm to amenity*" with sunlight, daylight and overshadowing listed as factors to be considered.

10.28 The document goes on to state that LBC "*will take into account the most recent standards recommended by the Building Research Establishment (currently the Building Research Establishment's Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice 2011)"* and that further detail is provided within the council's supplementary planning document 'Camden Planning Guidance 6: Amenity'.

Other Guidance

Historic England Guidance on Tall Buildings – Historic England Advice Note 4, 2015

10.29 Paragraph 4.10 of the Historic England Advice Note 4[13] recommends that the following should be addressed in relation to tall buildings:

10.30 *"consideration of the impact on the local environment, including microclimate, overshadowing, night-time appearance, vehicle movements and the environment and amenity of those in the vicinity of the building"*.

Building Research Establishment Guidelines: Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice, Second Edition, 2011

10.31 The Building Research Establishment (BRE) Guidelines 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice 2011, 2nd edition'[1] provides advice on site layout planning to achieve good sunlighting and daylighting within buildings, and in the open spaces between them. It is intended for use by building designers, developers, consultants and Local Planning Authorities (LPAs). The advice it gives is not mandatory and should not be used as an instrument of planning policy. As such it states:

10.32 *"This guide is a comprehensive revision of the 1991 edition of Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice. It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location."*

[7] Greater London Authority, 2016. Housing Supplementary Guidance. London. GLA.
[8] Greater London Authority, 2014. Sustainable Design and Construction Supplementary Planning Guidance. London. GLA.
[9] London Borough of Camden, 2010. Core Strategy 2010-2025. London. LBC.
[10] London Borough of Camden, 2010. Camden Development Policies 2010-2025. London. LBC.
[11] London Borough of Camden, 2013. Camden Planning Guidance Amenity CPG6 (2013 including further updates 2016). London. LBC.
[12] London Borough of Camden, 2016. Camden Local Plan (proposed submission). London. LBC.
[13] Historic England, 2015. Historic England Guidance on Tall Buildings – Historic England Advice Note 4.

10.33 It also states the following at:

- paragraph 1.6: "*The advice is given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. In special circumstances the developer or planning authority may wish to use different target values… in an area with modern high rise buildings, a higher degree of obstruction maybe unavoidable if new developments are to match the height and proportions of existing building*".
- paragraph 1.3: "*It is intended to be read in conjunction with the interior daylighting recommendations in the British Standard 8206-2 Code of practice for daylighting, and in the CIBSE publication Lighting guide: daylighting and window design*".

British Standard 8206 Part 2; Lighting for Buildings. Code of Practice for Daylighting, 2008

10.34 The British Standard 8206 part 2[14] provides recommendations regarding the design for daylight in buildings and sets out various methods for assessing daylight. The document states the following:

10.35 *"Daylighting gives to a building a unique variety and interest. An interior which looks gloomy, or which does not have a view to the outside when this could reasonably be expected, will be considered unsatisfactory by its users."*

Daylighting and Window Design: Lighting Guide LG10, 1999

10.36 This guide[15] replaced the CIBSE Applications Manual Window Design (1987) and provides a daylight design guide. It states the following:

10.37 *"when daylighting decisions are made, however, they will have implications for other, interrelated aspects of window performance such as solar heat gain, winter heat loss, provision of view, acoustic performance, privacy, security and protection from fire."*

Commission Internationale de L'Eclairage 146:2002 & CIE 147:2002 Collection on Glare, 2002

10.38 The CIE 146:2002[16] Collection on glare states the following:

10.39 *"Disability glare is glare that impairs vision (CIE, 1987). It is caused by scattering of light inside the eye [...]. The veiling luminance of scattered light will have a significant effect on visibility when intense light sources are present in the peripheral visual field and the contrast of objects to be seen is low."*

10.40 *"Disability glare is most often of importance at night when contrast sensitivity is low and there may well be one or more bright light sources near to the line of sight, such as car headlights, streetlights or floodlights. But even in daylight conditions disability glare may be of practical significance: think of traffic lights when the sun is close to them, or the difficulty viewing paintings hanging next to windows."*

Institute of Lighting Professionals Guidance Notes for the Reduction of Obtrusive Light (GN01:2011), 2011

10.41 The document"[17] provides quantitative criteria for acceptable levels of light pollution and distinguishes between rural and dense urban areas.

Consultation Feedback

10.42 As discussed in Chapter 2: EIA Process and Methodology, consideration has been given in this assessment to the formal EIA Scoping Opinion comments provided by LBC and consultees in respect to the proposed development. These key considerations are summarised in Table 10.1.

Table 10.1: EIA Scoping Consultation Feedback

Consultee	Comment	Where in the Chapter this comment is addressed
LBC	The key issues, likely significant effects and approach and methodology appear appropriately identified.	N/A

Assessment Methodology

10.43 The following section outlines the methodologies applied to identify and assess the potential daylight, sunlight, overshadowing, solar glare and light pollution impacts and effects likely to result from the proposed development.

Study Area

10.44 For daylight and sunlight, the study area was defined by the extent of residential/educational properties which have windows facing the application site and that were considered in close enough proximity to the application site to be affected by the proposed development.

10.45 In relation to the transient overshadowing assessment, amenity areas considered in close enough proximity to be affected by shadow cast from the proposed development were identified. As defined in the Method of Assessment section below.

10.46 For the study areas discussed above, the distance between the application site and those properties considered in close enough proximity of the application site was determined by using professional judgement based on the scale of the proposed development.

10.47 For the solar glare assessment, using professional judgement, the study area was defined by identifying viewpoints from road junctions and railway tracks in close proximity to the application where the proposed development would be visible.

10.48 For the light pollution assessment, the study area was defined by identifying the residential buildings that would overlook the office element of the proposed development that are within close enough proximity (20 m). In this assessment, no existing residential receptors were identified; however the residential element of a nearby cumulative scheme was identified as a future sensitive receptor.

Baseline Characterisation

10.49 A baseline characterisation study was completed by firstly undertaking a review of the surrounding land uses using information and data sourced from the Council Tax website[18]. This review was undertaken for all surrounding properties in close proximity to the application site and identified as potential sensitive receptors.

10.50 This was followed by a site visit to confirm existing conditions around the application site in April 2017. The existing conditions are not considered to have changed since this site visit was undertaken.

10.51 Based on the above, a 3D AutoCad model was developed for the existing surrounding properties and existing buildings on-site, using a full topographical survey, photogrammetric survey and site photographs.

10.52 The Baseline Conditions for daylight, sunlight and overshadowing is shown in Drawings 10766/01 - 03 in Technical Appendix 10.1 in ES Volume 3A.

[14] British Standards Institution, 2008. BS8206-2: 2008 Lighting for buildings; Code of Practice for Daylighting. BSI.
[15] Chartered Institution of Building Service Engineers, 1999. Applications Manual: Window Design of the Chartered Institute of Building Services Engineers.
[16] Commission Internationale de L'Eclairage, 2002. 146:2002 & CIE 147:2002 Collection on Glare.
[17] Institute of Lighting Professionals, 2011. Guidance Notes for the Reduction of Obtrusive Light GN01:2011, 2011.
[18] https://www.gov.uk/topic/local-government/council-tax

Method of Assessment

Assessment Scenarios

10.53 The following scenarios have been assessed and are reported within this assessment:

- Existing Baseline;
- Baseline + Proposed Development; and
- Baseline + Proposed Development + Cumulative Schemes.

10.54 A consented cumulative scheme can obscure the view of the proposed scheme from the viewpoints identified and therefore mask potential instances of solar reflection and consequently the likely solar glare effects. Owing to this, the Solar Glare assessment has been undertaken of the proposed development scenario only as this is considered to represent the worst case scenario.

10.55 The Light Pollution assessment has been undertaken only in the cumulative scenario as the sensitive receptors are within the consented cumulative scheme on 100 Chalk Road.

Existing Baseline

10.56 This scenario considers the current baseline condition (as observed during the April 2017 site visit). It is depicted on drawings 10766/01-03 (Technical Appendix 10.1, ES Volume 3A).

Proposed Development

10.57 This scenario consists of the proposed development in the context of the surrounding existing environment. This scenario has assessed the potential daylight, sunlight, overshadowing and solar glare effects of the proposed development on the surrounding residential receptors and amenity spaces, as well as sensitive road junctions and train signals as appropriate. In ascertaining the impacts, comparisons have been made with the baseline scenario.

10.58 The proposed development scenario is illustrated on drawings no. 10766/04-06 in (Technical Appendix 10.1, ES Volume 3A).

Cumulative

10.59 The cumulative scenario considers the proposed development, the surrounding existing context, as well as, the surrounding consented schemes and compares this against the baseline. Details of the cumulative schemes considered in the assessment are presented in Chapter 2: EIA Process and Methodology.

10.60 Professional judgement has been applied to identify the specific cumulative schemes for consideration, so as to ensure that only the cumulative schemes with the potential to generate effects relating to daylight, sunlight, overshadowing, solar glare and light pollution, in conjunction with the proposed development, are included within the cumulative effects assessment.

10.61 Those schemes considered in close proximity to the application site and residential receptors such that cumulative effects may occur are as follows:

- 100, 100a, 100b Chalk Farm Road; and
- 44-44a Gloucester Avenue.

10.62 In this scenario a light pollution assessment was undertaken to analyse any potential light spillage from the proposed office element onto the consented scheme at 100 Chalk Farm Road.

10.63 This scenario is depicted on drawings no. 10766/07-09 (Technical Appendix 10.1, ES Volume 3A).

Demolition and Construction Effects

10.64 Owing to the evolving and changing nature of demolition and construction activities, the assessment of potential impacts and likely effects during demolition and construction of the proposed development on daylight and sunlight to surrounding properties has not been modelled. Instead, a qualitative assessment has been undertaken using professional judgement and experience.

10.65 The potential daylight and sunlight effects relating to demolition and construction works would vary throughout the construction programme and gradually increase to the potential effects identified for the completed proposed development. It is therefore considered that the completed proposed development represents the worst case assessment in terms of likely daylight, sunlight, overshadowing, solar glare and light pollution.

Completed Development Effects

10.66 The following methodologies have been used to assess the daylight and sunlight effects on the sensitive receptors of surrounding properties when the proposed development is completed and operational:

- Daylight
  - Vertical Sky Component (VSC); and
  - No Sky Line (NSL) Method.
- Sunlight
  - Annual Probable Sunlight Hours (APSH).

10.67 The methodologies used for assessing the overshadowing effects on external amenity areas are the Sun Hours on Ground and Transient Overshadowing assessments.

10.68 Possible solar glare effects on road users and train drivers have been considered using the Solar Glare assessment methodology described below

10.69 Potential artificial light spillage on residential receptors have been identified within residential units of the cumulative 100, 100a, 100b Chalk Farm Road scheme that face on to the office element of the proposed development.

Daylight and Sunlight

10.70 The technical analyses carried out to inform the assessments have been undertaken by creating a digital three dimensional (3D) model of the existing site and proposed development, based on measured survey data.

Daylight

Vertical Sky Component

10.71 The VSC method of assessment is defined in the BRE Guidelines as the:

"ratio of that part of illuminance at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminate on a horizontal plane due to an unobstructed hemisphere of this sky".

10.72 The 3D model uses Waldram Diagrams to establish the VSC and 3D geometric calculations for daylight distribution. This model (which is orientated to north by the use of Ordnance Survey (OS) information) enables the path of the sun to be tracked throughout the year to establish the shadow cast by the existing and proposed buildings, and thus calculate the sun hours on ground in each scenario.

10.73 Only those surrounding properties which have windows facing towards the application site were included in the assessment. If a nearby property has no windows facing the application site, these properties would not be affected by the proposed development in terms of light.

10.74 The assessment is calculated from the centre of a window on the outward face and measures the amount of light available on a vertical wall or window following the introduction of visible barriers, such as buildings. Trees may be ignored unless they form dense continuous belts.

10.75 The maximum VSC value is almost 40 % for a completely unobstructed vertical wall or window. In terms of assessment criteria, the BRE Guidelines state that:

"If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if either:

- *the VSC measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value; or*
- *the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value."*

No Sky Line

10.76 The BRE Guidelines state that where room layouts are known, the effect on the daylight distribution can be calculated by plotting the NSL. In terms of the surrounding receptors, it has not been possible to obtain room layouts for all of the properties and therefore layouts have been assumed where information was not available.

10.77 The NSL method is a measure of the distribution of daylight at the 'working plane' within a room. The 'working plane' is a horizontal plane 0.85 m above finished floor level for residential properties. The NSL divides those areas of the working plane which can receive direct sky light from those which cannot. If a significant area of the working plane lies beyond the NSL (i.e. it receives no direct sky light), then the distribution of daylight in the room may be poor and supplementary electric lighting may be required.

10.78 Where actual room layouts were available, these have been considered in the modelling of the internal layouts within the surrounding properties. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL. Where layout information was not available assumptions have been made as to the use and internal configuration of the rooms (from external observations) behind the fenestration observed. In such cases a standard 4.2 m (14 ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable.

10.79 The likely effects of daylighting distribution in an existing building can be determined by plotting the NSL in each of the main rooms. For houses, this includes living rooms, dining rooms and kitchens. Bedrooms should also be analysed, although they are less important. The BRE Guidelines identify that if the area of a room that does receive direct sky light is reduced to less than 0.8 times its former value, then this would be noticeable to its occupants.

10.80 BS 8206 Part 2 states (paragraph 5.7) that the:

"uniformity of daylight is considered to be unsatisfactory if a significant part of the working plane (normally more than 20%) lies behind the no-sky line".

10.81 Therefore, an NSL of at least 80 % would be considered satisfactory.

10.82 In relation to deep rooms lit by windows on one side, the BRE Guidelines state (paragraph 2.2.10) that:

"If an existing building contains rooms lit from one side only and greater than 5 m deep, then a greater movement of the no sky line may be unavoidable."

Average Daylight Factor

10.83 The Average Daylight Factor (ADF) is derived from the BS 8206 Part 2 and is defined within the 2011 BRE Guidelines as *"a ratio of total daylight flux incident on a reference area to the total area of the reference area, expressed as a percentage of outdoor luminance on a horizontal plane, due to an unobstructed sky of assumed or known luminance distribution"*.

10.84 It is sometimes questioned whether the use of the ADF is valid when assessing the impact on neighbouring buildings. Appendix F of the BRE provides several circumstances where the use of ADF may be considered appropriate for an existing surrounding receptor. The ADF may be applied where a building is proposed but not yet built or occupied. The ADF approach has been used in the cumulative scenario to assess the daylight levels within cumulative schemes at 44-44a Gloucester Avenue and 100 Chalk Farm Road and therefore for the purposes of the cumulative assessment the two cumulative schemes have been included in the baseline. However the buildings are not complete nor are the units occupied and experiencing the current levels of daylight. Therefore it would not be appropriate to report a loss of daylight by reference to percentage change.

10.85 The ADF method of assessment considers:

- The diffuse visible transmittance of the glazing to the room in question (i.e. how much light gets through the window glass). A transmittance value of 0.8% is assumed for single glazing and 0.65% for double glazed windows;
- The net glazed area of the window in question;
- The total area of the room surfaces (ceiling, walls, floor and windows); and
- The angle of visible sky reaching the window(s) in question.

10.86 In addition, the ADF method makes allowance for the average reflectance of the internal surfaces of the room and of external obstruction (assumed to be 0.5 unless otherwise stated).

Sunlight

Annual Probable Sunlight Hours

10.87 APSH is measured using a sun indicator containing 100 spots, each representing 1% of APSH. Therefore, where no obstruction exists the total annual probable sunlight hours would amount to 1,486 hours and therefore each spot equates to 14.86 hours of the total annual sunlight hours.

10.88 The number of spots is calculated for the baseline and proposed development scenarios during the year and also during the winter period, and a comparison made between the two. This provides a percentage of APSH for each window assessed.

10.89 The BRE Guidelines note that:

- "*In housing, the main requirement for sunlight is in living rooms, where it is valued at any time of day, but especially in the afternoon*.";
- "*all main living rooms of dwellings…should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun*.";
- "*If the main living room to a dwelling has a main window facing within 90° of due north, but a secondary window facing within 90° of due south, sunlight to the secondary window should be checked*."; and
- "*…a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day*".

10.90 In relation to existing surrounding receptors, the BRE Guidelines state that a window may be adversely affected if a point at the centre of the window receives for the whole year, less than 25 % of the APSH, including at least 5 % of the APSH during the winter months (21st September to 21st March) and less than 0.8 times its former sunlight hours during either period, and if there is a reduction in total APSH which is greater than 4 %.

10.91 BS 8206 Part 2 (section 5.2) states that:

- "*Provided that the entry of sunlight is properly controlled, it is generally welcome in most buildings in the UK. Dissatisfaction can arise as much from the permanent exclusion of sunlight as from its*

excess. The provision of sunlight is important in dwellings, particularly during winter months. Sunlight is especially valued in habitable rooms used for long periods during the day."

- "*Interiors in which the occupants have a reasonable expectation of direct sunlight should receive at least 25% of probable sunlight hours (see 2.10.2). At least 5% of probable sunlight hours should be received during the winter months, between 21 September and 21 March. Sunlight is taken to enter an interior when it reaches one or more window reference points*."

10.92 It is often not possible to determine the room uses within each of the neighbouring properties, nor is it clear which windows should be considered as the 'main windows'. Therefore, regardless of use, all the rooms with windows facing the application site and within 90 degrees of due south have been considered in the assessment.

Summary of Criteria for Daylight and Sunlight

10.93 Table 10.2 provides a summary of the criteria set out within the BRE Guidelines for daylight and sunlight that have been applied within this assessment.

Table 10.2: Summary of Daylight and Sunlight Assessment Criteria

Method	BRE Criteria
VSC	A window may be adversely affected if its VSC measured at the centre of the window is less than 27% and less than 0.8 times is former value.
NSL	A room may be adversely affected if the daylight distribution (NSL) is reduced beyond 0.8 times its existing area.
APSH	A window may be adversely affected if a point at the centre of the window received for the whole year, less than 25 % of the APSH including at least 5 % of the APSH during the winter months (21st September to 21st March) and less than 0.8 times its former sunlight hours during either period, and for existing neighbouring buildings, if there is a reduction in total APSH which is greater than 4 %.

Overshadowing

Transient Overshadowing

10.94 Where a proposed development includes tall buildings, these may affect the sunlight availability to gardens or open spaces in close proximity to the application site. Owing to the southerly location of the sun path, only amenity areas located within 90° of due north of the proposed development have the potential to be affected by overshadowing from tall buildings and therefore taken into consideration in this assessment.

10.95 The BRE Guidelines suggest plotting a series of shadow plans illustrating the location of shadows cast from those buildings at different times of the day and period of the year to assess the potential overshadowing effects. To this end, the overshadowing plots are mapped for the three key dates listed below:

- 21st March (Spring Equinox);
- 21st June (Summer Solstice); and
- 21st December (Winter Solstice).

10.96 The 21st September (Autumn Equinox) is not assessed owing to the identical solar altitude and therefore equivalent outcomes of overshadowing to those presented for 21st March.

10.97 For each of these dates, the overshadowing is calculated at hourly intervals throughout daylight hours from sunrise to sunset. On 21st December, the sun is at its lowest altitude consequently creating long shadows to be cast and represents the worst case scenario in terms of overshadowing.

10.98 The analysis described above varies according to different latitudes. The application site is located within London, which is at a latitude of 51.5° north.

Sun Hours on Ground

10.99 The method for assessing hours in sun is the 'sun-on-ground indicator'. The assessment applies to existing gardens/amenity areas, which are affected by new developments.

10.100 Guidelines suggest that the Spring Equinox (21st March) is a suitable date for the assessment. Using specialist software, the path of the sun is tracked to determine where the sun would reach the ground and where it would not.

10.101 The BRE Guidelines recommend that at least half of a garden or amenity area should receive at least 2 hours of sunlight on March 21st or the area which receives 2 hours of direct sunlight should not be reduced to less than 0.8 times its former value (i.e. there should be no more than a 20 % reduction).

Solar Glare

10.102 Solar reflections off a building are particularly important at road junctions where glare can cause temporary blinding of drivers. Typically those elements considered reflective are either glazed elements or specular metal cladding.

10.103 The BRE Guidelines includes the following statement in regard to the potential for reflected solar glare from a new development:

10.104 *"Glare or solar dazzle can occur when sunlight is reflected from a glazed façade. This can affect road users outside and the occupants of adjoining buildings. The problem can occur either when there are large areas of reflective glass or cladding on the façade, or when there are areas of glass or cladding which slope back so that high altitude sunlight can be reflected along the ground. Thus solar dazzle is only a long term problem only for some heavily glazed (or mirror clad) buildings…"*

Viewpoints for Road Users and Train Drivers

10.105 As indicated previously, the assessment considers potentially sensitive viewpoints for road users and train drivers surrounding the application site. The viewpoints are generally located at the minimum stopping distance and at the driver's eye level. The focal point is a relevant traffic element, such as signals or incoming traffic.

10.106 Identifying the viewpoints based on the stopping distance is calculated as the combination of thinking and braking distances, using the following formula:

Dtotal = Dthinking + Dbraking = V*T + V2/(2μ*g)

Where each component is:

- V = Relevant vehicle speed, typically the road speed limit;
- T = Thinking time (0.67 sec);
- μ = Braking effort (considered 0.65 for cars and 0.5 for buses); and
- g = Gravity acceleration.
- D = Distance

10.107 The height of the viewpoint is considered to be 1.5 m for cars and 2.0 m for buses. Figure 10.1 identifies the typical stopping distance range for a car travelling at different speeds. Therefore, a viewpoint for a car driving at 30 mph (i.e. speed limit for a dense urban location) would be placed at 23 m from a traffic light and 1.5 m above the ground.

10.108 The assessment also considers a driver's field of vision which takes the angular extent seen at any given time, which for humans facing forwards is approximately 180 degrees.

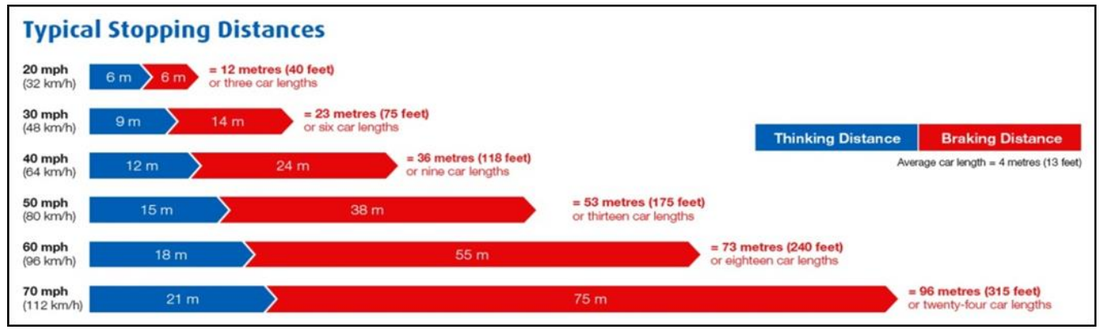

Figure 10.1: Typical Stopping Distances for a Car[19]

10.109 In the case of a train driver the view direction is defined by the rail tracks. The Railway Group Guidance Note[19] set the eye level of the driver at 2.75 m above the rails. The view point is centred between the tracks for ease of reference. Although train drivers sit slightly to the left within the cabin, this bears no material effect on the analysis of the images as the signals are visible at a distance of hundreds of metres at which point the slight shift in the cabin equates to a very small angular change.

Solar Glare Technical Assessment

10.110 The potential for reflected solar glare or *"dazzle"* from the glazed or reflective façades of the proposed development has been assessed using specialist lighting software. The assessment shows the path of the sun for the entire year around the proposed development. From this, two computer generated angular images have been produced for each selected viewpoint, indicating the times of the day and periods of the year when solar reflections would be given off the proposed building facades. A modified diagram portraying a standardised extent of human vision is then overlaid onto the image.

10.111 The fovea centralis (also generally known as the fovea) is a part of the eye, located in the centre of the macula region of the retina. The fovea is responsible for sharp central vision (also called foveal vision), which is necessary in humans for reading, watching television, driving, and any activity where visual detail is of primary importance[20]. The macula corresponds to the central 13° of the visual field; the fovea to the central 3°[21].

10.112 Figure 10.2 highlights the degrees of vision corresponding to the foveal view, with a red circle of 3° of angle in order to identify the area most sensitive to reflected solar glare. Another red circle represents the incidence of the 30° radius of our typical field of view in order to identify a secondary area of sensitivity to potential reflected glare instances.

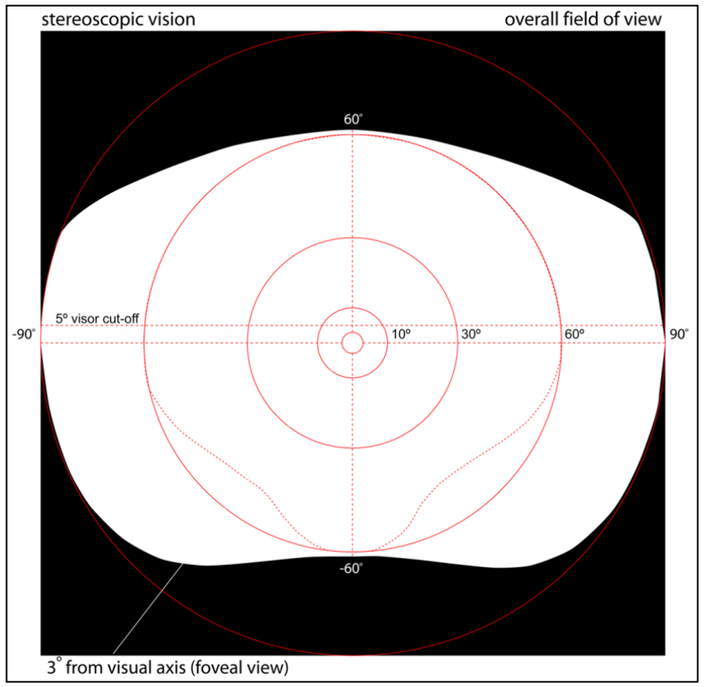

Figure 10.2: Field of Vision Diagram

10.113 The degrees of vision provide a reference from which potential concerns can be judged. At 3°, the potential for the reflected glare to cause a hazard is high and mitigation would be required. Between 3° and 30°, there is the potential that there could be an issue and mitigation may be necessary.

10.114 As stated in the CIE 146:2002, occurrences at angles beyond 30° would be of little significance in most situations, but may be relevant in exceptional circumstances. When seated in a driving seat of a typical car or train, for example, the limits of the windscreen would generally obstruct the driver's view at angles beyond 30° from the line of sight. Therefore the risk of reflective solar glare causing a hazard is reduced and, as such, mitigation would make only a minor difference.

10.115 It must be noted, the solar glare assessments undertaken assume a worst-case scenario whereby the sun will shine every day during daylight hours which is not the case within the UK or London.

Light Pollution

10.116 As noted earlier, there is a potential for the office element of the proposed development to have a light pollution impact on future residential properties of the cumulative 100, 100a, 100b Chalk Farm Road scheme.

10.117 Light pollution is defined as any light emitting from artificial sources into spaces where it is unwanted, such as spillage of light from office or commercial buildings onto residential accommodation, where this would cause nuisance to the occupants. The ILP Guidance Notes provide suggested lighting level values to ascertain the acceptability of lighting levels of light pollution.

10.118 It should be noted that artificial light is not always perceived as being negative, particularly in areas of high crime where good street lighting and light into street environments is seen as a positive attribute. Adverse effects caused as a result of electric lighting include the intrusion of light into sensitive locations

[19] Rail Safety and Standards Board, 2003. Railway Group Guidance Note. GE/GN8537 Guidance on Signal Positioning and Visibility.
[20] *"Simple Anatomy of the Retina"*. Webvision. University of Utah, http://webvision.med.utah.edu/book/part-i-foundations/simple-anatomy-of-the-retina/)

[21] Robert H. Spector, 1990. Clinical Methods: The History, Physical, and Laboratory Examinations, 3rd edition, Chapter 3 - www.ncbi.nlm.nih.gov/books/NBK220/

such as adjacent residential accommodation, areas of special night-time interest, or needless spillage into the night sky.

10.119 It should also be noted that the ILP Guidance relates and refers to external luminaires. However, commercial buildings with large areas of glazing and possible night-time usage can sometimes cause light intrusion from their internal luminaires. For this reason, quantitative light pollution assessments have been undertaken in relation to these internal luminaires.

10.120 Potential light pollution effects of a new development are typically assessed in relation to four specific criteria:

- Sky Glow is the brightening of the night sky over our towns, cities and countryside. It can be quantified by measuring the Upward Light Ratio (ULR), which is the maximum permitted percentage (%) of luminaire flux for the total installation that goes directly into the sky;
- Light Intrusion is the spilling of light beyond the boundary of a proposed development. It is assessed as vertical illuminance in lux (Ev) measured flat at the centre of the sensitive receptor;
- Luminaire Intensity is the uncomfortable brightness of a light source when viewed against a dark background. It is applied to each source visible from a sensitive receptor and is measured as source intensity (I) (kcd); and
- Building Luminance which can cause an increase in the brightness of a general area and is measured in cd per metre squared (L) as an average over the building facade caused only by external lighting.

10.121 The proposed development would include external lighting; however as this is yet to be designed it cannot be technically assessed. Any proposed lighting would however be designed and installed according to the ILP's specifications and as such the effects would be negligible.

10.122 Whilst the ILP guidance refers only to high powered external lighting there is the possibility of light pollution caused by the internal luminaires of highly glazed office buildings. Whilst a detailed internal lighting design has yet to be specified, a light intrusion assessment as outlined below has been undertaken in order to quantify any potential effects. Technical assessment of Sky Glow, Luminaire Intensity or Building Luminance is inappropriate for internal lighting and have therefore not been considered further.

Light Intrusion Methodology

10.123 Light pollution is not a comparative assessment; the fact it may occur in the baseline does not necessarily justify its occurrence as a result of the proposed development. Therefore the assessment considers the effect of the proposed development in absolute terms, by reference to the relevant guidance levels.

10.124 The assessment has been undertaken by preparing a computer generated 3D model of the proposed development and using specialist lighting simulation software. The light fittings used for this lighting simulation represent typical recessed office luminaires regularly spaced on the proposed office ceilings within the proposed commercial building in order to achieve an average illuminance of 500 lux across the working plane as recommended by the BS EN 12464-1-2002 - Lighting of work places, Table 5.3. This assessment assumes that all luminaires are switched on at once and no blinds or shading devices are deployed for the purpose of the light pollution assessment. For this reason it should be considered a worst-case scenario.

10.125 The assessment has also analysed the impact of the proposed PFS to be located on the ground floor of the PFS Block at the PFS parcel. An average illuminance of 150 lux has been considered following the guidance of the BS EN 12464-2-2007 - Lighting of work places, Table 5.6.

10.126 Table 10.3 sets out the environmental zones as per the ILP Guidance which have been applied in this assessment.

Table 10.3: ILP Light Pollution Criteria for Environmental Zones

Environmental Zone	Sky Glow ULR (Max %) (1)	Light Intrusion (into windows) Ev (Lux) (2)		Luminaire Intensity (candelas) (3)		Building Luminance Pre-curfew (4)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average L[cd/m²]
E0 – Dark areas (e.g. UNESCO Starlight Reserves, IDA Dark Sky Parks)	0	0	0	0	0	0
E1- Intrinsically dark areas (e.g. National Parks, areas of outstanding natural beauty)	0	2	0 (1*)	2,500	0	0
E2- Low district brightness (e.g. rural or small village locations)	2.5	5	1	7,500	500	5
E3- Medium district brightness (e.g. small town centres or urban locations)	5.0	10	2	10,000	1,000	10
E4- High district brightness (e.g. town/city centres with high levels of night time activity)	15.0	25	5	25,000	2,500	25

Notes:
ULR = Upward Light Ratio of the Installation is the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky
Ev = Vertical Illuminance in Lux and is measure flat on the glazing at the centre of the window
I = Light Intensity in Candela (Cd)
L = Luminance in Cd/m^2
Curfew = The time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by the planning authority. If not otherwise stated – 23.00 hrs is suggested.
* = From Public road lighting installations only.

10.127 With reference to Table 10.3, taken from the ILP guidance, the application site is classified as located within environmental zone E4. This zone allows for a maximum pre-curfew light intrusion level of 25 lux and a maximum post-curfew light intrusion level of 5 lux.

Significance Criteria

10.128 In terms of sensitivity, adjoining residential properties have been considered sensitive to daylight and sunlight levels, and specifically habitable rooms within the properties such as living rooms, kitchens and bedrooms, in accordance with the BRE Guidelines. All of the existing receptors that have been assessed as listed in the Baseline Conditions section are considered of high sensitivity due to the expectation of natural light and given equal weighting, and therefore each individual receptor is not assigned a level of sensitivity as per the usual EIA methodology i.e. high, medium, low or very low.

10.129 For transient overshadowing, all public areas of open space such as playgrounds, playing fields, parks and squares in close proximity to the application site are considered of high sensitivity and have therefore been considered within the assessment.

10.130 In terms of Sun Hours on Ground the play area/gardens on Juniper Crescent to the north of the application site have been identified as sensitive receptors in relation to the proposed development.

10.131 For solar glare, viewpoints at signals on train lines and at traffic signals on roads within the surrounding area that also have a view of the proposed development have been identified as sensitive and included within the assessment.

10.132 For light pollution, the residential properties located within the consented scheme at 100 Chalk Road have a view the proposed development and are therefore considered to be sensitive.

10.133 The key terminology used to describe the scale of effects is as follows and is further described in the below sections of this chapter:

- Major;
- Moderate;
- Minor; and
- Negligible.

10.134 The nature of the effects may be either adverse (negative), beneficial (positive) or negligible (no notable effect on a receptor).

10.135 Following the scale of an effect, using this methodology a clear statement is then made as to whether the effect is significant or not significant. As a general rule, the following criteria is applied:

- 'Moderate' or 'major' effects are deemed to be 'significant';
- 'Minor' effects are considered to be 'not significant', although they may be a matter of local concern; and
- 'Negligible' effects are considered to be 'not significant' and not a matter of local or wider concern.

Daylight and Sunlight

10.136 For daylight and sunlight, the BRE Guidelines outline the approach within the accompanying appendix, in terms of assigning criteria to assess the effects:

10.137 *"Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required, or in the amount of sunlight reaching an open space… The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied."*

10.138 *"Where the loss of skylight or sunlight fully meets the guidelines, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines and a larger number of windows or open space are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space."*

10.139 *"Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or major adverse. Factors tending towards a minor adverse impact include:*

- *Only a small number of windows or limited area of open space are affected;*
- *The loss of light is only marginally outside the guidelines;*
- *An affected room has other sources of skylight or sunlight; and*
- *The affected building or open space only has a low level of requirement for skylight or sunlight*."

10.140 The classification of major adverse is documented within Paragraph 7 of the BRE Guidelines:

- "*Factors tending towards a major adverse impact include:*
  - *a large number of windows or large area of open space are affected;*
  - *the loss of light is substantially outside the guidelines;*
  - *all the windows in a particular property are affected; and*
  - *the affected indoor or outdoor spaces have a particular strong requirement for skylight or sunlight, e.g. a living room in a dwelling or a children's playground*".

10.141 Where the BRE Guidelines are met, the effects would be considered negligible.

10.142 Professional judgement has been used to determine whether the change would result in adverse or beneficial daylight and sunlight effects. The initial numerical criteria for determining the scale of effect is based on percentage alterations, as follows:

- 0-19.9% alteration = negligible;
- 20-29.9% alteration = minor;
- 30-39.9% alteration = moderate; and
- 40% alteration = major.

10.143 However, when assigning significance per property professional judgement has been applied with consideration given to the proportion of rooms/windows affected, as well as the percentage alterations, absolute changes, and any other relevant factors, such as there may be mitigating factors such as balconies, overhangs or design features which may also affect the determination of assigning the criteria.

10.144 In addition, a 'Contextual Density and Daylight Research' report has been produced and accompanies the application. This report implements guidance from the Housing SPG previously considered in the policy section along with the Housing White Paper[22] and presents a borough-wide daylight analysis to study the recurrent urban grain patterns and the corresponding daylight provision in the LBC. This research report is drawn upon where relevant within the mitigation measures section of this ES chapter.

Transient Overshadowing

10.145 The BRE Guidelines do not include criteria for the significance of transient overshadowing other than to identify the different times of the day and year when shadow would be cast over a surrounding area.

10.146 The assessment of likely effects as a result of transient overshadowing is therefore based on professional judgement, taking into consideration the conditions of the existing site and surrounding area, and comparing these conditions against the effect of the proposed development.

Sun Hours on Ground

10.147 Table 10.4 sets out the numerical criteria adopted in regard to the sun on ground assessment based on professional judgement.

Table 10.4: Sun Hours on Ground Significance Criteria

Significance	Numerical criteria on 21 March
Negligible	Over 50% of the amenity area will receive 2 hours of sunlight or less than 20% alteration in area which receives 2 hours of direct sunlight.
Minor adverse	20-29.9% reduction in the area which receives 2 hours of direct sunlight.
Moderate adverse	30-39.9% reduction in the area which receives 2 hours of direct sunlight
Major adverse	40%+ reduction in the area which receives 2 hours of direct sunlight

[22] Department for Communities and Local Government (DCLG), 2017. Housing White Paper.

Solar Glare

10.148 There are no quantitative criteria within the BRE Guidelines or elsewhere regarding acceptable levels of solar glare. However, solar reflections at high altitudes are less likely to cause nuisance or distraction as one has to look upwards to see it.

10.149 Professional judgement has therefore been applied to assign the significance of solar glare arising from the proposed development and to determine the criteria for assessing the significance of solar glare set out in Table 10.5.

10.150 The criteria presented in Table 10.5 was initially used to ascertain the possible significance for each view and the factors listed above have then been taken into consideration to determine the overall significance for the designated viewpoint.

Table 10.5: Solar Glare Effects Criteria

Significance Rating/Scale	Possible Factors
Negligible	No reflections are visible or if visible all occur at angles greater than 30° from the driver's line of sight and so, as stated by the CIE, will be of *"little significance"*
Minor	Solar reflections are visible within 30° to 10° or between 10° to 5° of the driver's line of sight for a short period of time e.g. one or two months of the year.
Moderate	Solar reflections are visible within 10° and 5° of the driver's line of sight occurring for a long period of time e.g. over the majority of the year.
Major	Solar reflections are visible within 5° of a driver's line of sight.
Note – Mitigating factors such as alternative and unaffected signals/traffic lights and car visor angle may result in the assignment of significance which differs from the above.	

10.151 Multiple viewpoints may be chosen for each of the traffic lanes or signals affected. However, in terms of significance criteria, professional judgement has been used to determine the effect at the location rather than the individual perspectives at a signal traffic junction. Factors that influence the significance of an effect are:

- sunlight availability probability;
- area of façade off which reflections are visible;
- period of time when reflections are visible;
- angle at which reflections are visible from line of sight;
- views of the development being obscured for example by trees; and
- the time of day at which the solar reflection will occur for example during peak traffic times.

Light Pollution

10.152 The ILP Guidance Notes do not provide details on assigning of significance of effects for light pollution, therefore this is based on professional judgement considering the extent of the residential façade adversely affected, as well as the extent to which the thresholds set out in the guidance are exceeded.

Assumptions and Limitations

10.153 Where actual room layouts were available, these have been considered when modelling the internal layouts of surrounding properties. Where layout information was not available, assumptions have been made as to the use and internal configuration of the rooms (from external observations) behind the fenestration observed. In such cases a standard 4.2 m (14ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL.

10.154 Floor levels have been assumed for surrounding properties where access has not been obtained. With the working plane located 850 mm above the finished floor level, this has the potential to affect the assessment of NSL.

10.155 For Solar Glare, although great care is taken in identifying typical viewpoints, this does not guarantee that there are no additional sensitive locations where reflected solar glare could present a particular risk. This assessment is based on the assumption that in an urban environment moving traffic represents the biggest risk factor and so viewpoints and focus points are selected accordingly. For practical reasons the area of the assessment is limited to the area surrounding the proposed development. The occurrence of reflected solar glare at greater distances is not the subject of this assessment.

10.156 In addition, the methodology for solar glare is not aimed at addressing the intensity of an instance of reflected solar glare, but rather its occurrence, duration throughout the year, and the location of this occurrence in respect of an individual's line of sight. It is also be noted that the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account.

Baseline Conditions

Sensitive Receptors

Existing Sensitive Receptors - Daylight and Sunlight

10.157 The baseline section confirms that existing residential receptors are sensitive receptors that may be affected by the proposed development.

10.158 The following residential properties have been considered due to their proximity to the application site and are highlighted in red on Figure 10.3:

- 54-64 Juniper Crescent;
- 69-78 Juniper Crescent;
- 79-84 Juniper Crescent;
- 85-92 Juniper Crescent;
- 93-100 Juniper Crescent;
- 101-110 Juniper Crescent;
- Gilbeys Yard (Block A);
- Gilbeys Yard (Block B);
- 56-62 Gloucester Avenue (Evens);
- 66 Gloucester Avenue;
- 90 Camden Lock Place;
- 51 Chalk Farm Road;
- 52 Chalk Farm Road;
- 52a Chalk Farm Road;
- 55 Chalk Farm Road; and
- 57a Chalk Farm Road.

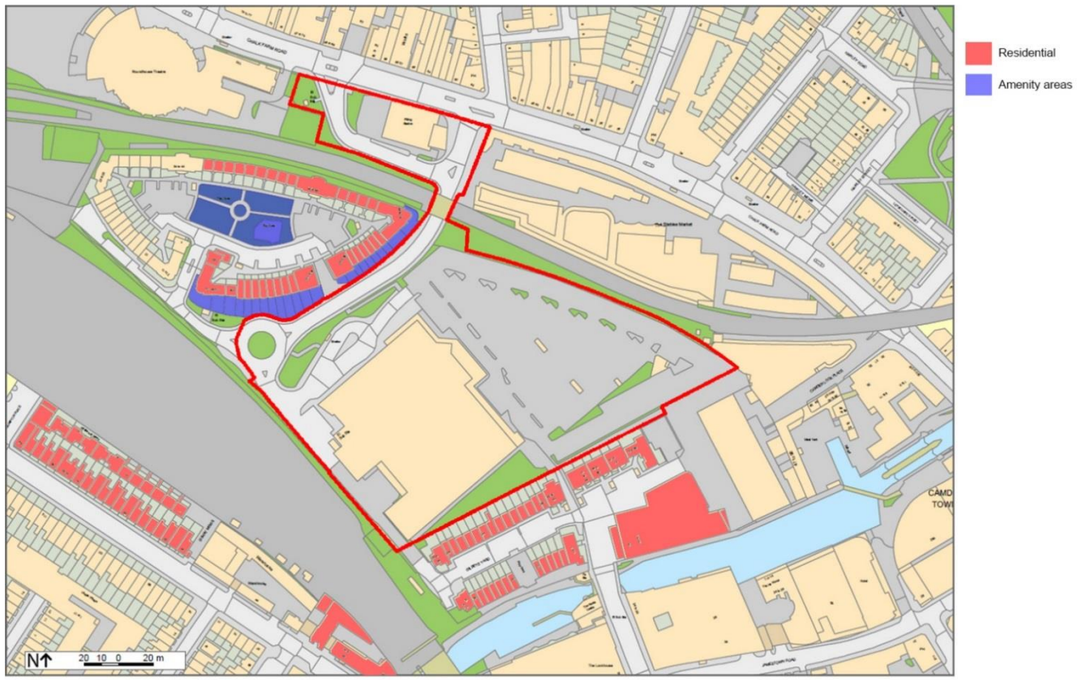

Figure 10.3: Location of Sensitive Receptors

Existing Sensitive Receptors - Overshadowing

10.159 The sun hours on ground and transient overshadowing assessments plots the shadows cast by the proposed development on the surrounding space with no specific reference to any amenity areas.

10.160 As the suns path is located in the south, only the amenity areas located to the north-west through to the north-east of the application site have been considered in the sun hours on ground assessment. The following private, public and communal areas of amenity have been identified as sensitive receptors and are presented in blue on Figure 10.3:

- The communal garden and play area on Juniper Crescent; and
- The gardens serving Juniper Crescent properties.

Existing Sensitive Receptors - Solar Glare

10.161 Road junctions are considered most sensitive in relation to solar glare and therefore consideration has been given to several viewpoints at traffic junctions from which the proposed development would be visible. The viewpoints assessed are presented in Figure 10.4.

10.162 In addition to road users, instances of solar reflection also have the potential to effect train drivers and their view of rail signals. Due to the proximity of the application site to the railway line, an assessment has been undertaken from these viewpoints.

10.163 Direction are indicated by orange arrows for road junctions and blue arrows for train line viewpoints.

Figure 10.4: Solar Glare Assessment Viewpoints

New Sensitive Receptors

10.164 Future sensitive receptors introduced to the application site by the proposed development, would include future residents. However, the assessment of daylight, sunlight and overshadowing within the proposed development itself is not included within this ES chapter as it is considered to be a design consideration rather than an assessment of environmental impacts. Accordingly the proposed development's daylight and sunlight assessments, are presented in ES Volume 3A Technical Appendix 10.6.

10.165 In addition to the future on-site residential receptors, there is a potential for the proposed development to impact on future residential properties that form part of the cumulative schemes. This is especially so in respect of daylight and light pollution, and as such the relevant assessments have been undertaken within the cumulative scenario.

Current Baseline

Daylight and Sunlight

10.166 The full baseline daylight and sunlight assessment is presented within Technical Appendix 10.2 and is summarised in Table 10.6.

Table 10.6: Summary of Baseline Daylight and Sunlight Levels to Surrounding Receptors

Address	Total No. Windows that meet VSC criteria (>27%)		Total No. of Rooms that receive NSL in excess of 80%		Total No. of windows that meet APSH criteria	
	Pass	Total	Pass	Total	Pass	Total
54-64 Juniper Crescent	16	16	8	8	0	0
69-78 Juniper Crescent	36	36	21	24	23	27
79 Juniper Crescent	4	4	3	3	4	4
80 Juniper Crescent	4	4	3	3	4	4
81 Juniper Crescent	4	4	3	3	4	4
82 Juniper Crescent	4	4	3	3	4	4
83 Juniper Crescent	4	4	3	3	4	4
84 Juniper Crescent	4	4	3	3	4	4
85-92 Juniper Crescent	16	16	16	16	16	16
93-100 Juniper Crescent	16	16	16	16	16	16
101 Juniper Crescent	4	4	3	3	4	4
102 Juniper Crescent	4	4	3	3	4	4
103 Juniper Crescent	4	4	3	3	4	4
104 Juniper Crescent	3	4	3	3	4	4
105 Juniper Crescent	4	4	3	3	4	4
106 Juniper Crescent	4	4	3	3	4	4
107 Juniper Crescent	4	4	3	3	4	4
108 Juniper Crescent	4	4	3	3	4	4
109 Juniper Crescent	6	6	3	3	6	6
110 Juniper Crescent	9	11	6	6	8	11
Gilbeys Yard (Block A)	70	76	53	66	0	0
Gilbeys Yard (Block B)	61	61	61	61	0	0
56 Gloucester Avenue	6	8	4	4	0	0
58 Gloucester Avenue	4	6	6	6	0	0
60 Gloucester Avenue	2	4	3	4	0	0
62 Gloucester Avenue	2	3	2	3	0	0
66 Gloucester Avenue	3	7	5	7	0	0
90 Camden Lock Place	28	28	15	15	9	12
51 Chalk Farm Road	2	2	2	2	2	2
52 Chalk Farm Road	2	2	2	2	2	2
52a Chalk Farm Road	2	2	2	2	2	2
55 Chalk Farm Road	4	4	2	2	4	4
57a Chalk Farm Road	5	5	2	2	5	5

Table 10.6: Summary of Baseline Daylight and Sunlight Levels to Surrounding Receptors

Address	Total No. Windows that meet VSC criteria (>27%)		Total No. of Rooms that receive NSL in excess of 80%		Total No. of windows that meet APSH criteria	
	Pass	Total	Pass	Total	Pass	Total
Total	**345**	**365**	**271**	**291**	**149**	**159**

10.167 Regarding daylight conditions in the baseline scenario, 345 (95 %) of the 365 windows assessed meet the BRE criteria for VSC by achieving a VSC level of 27 % or above. For NSL, 271 (93 %) out of the 291 rooms assessed meet the BRE criteria with 80 % or above daylight distribution.

10.168 The sunlight conditions in the baseline scenario show that 149 (94 %) out of the 159 windows assessed within the surrounding sensitive receptors meet the BRE criteria for both total and winter APSH.

10.169 These are considered very good levels of daylight and sunlight compliance given the urban location of the application site owing to the current low level of massing within the application site and is not considered consistent with existing buildings within other urban environments of a similar nature. Owing to this, the surrounding residents currently benefit from high daylight and sunlight levels that are not usually experienced within an urban context.

Overshadowing

10.170 The full baseline transient overshadowing assessment is presented within Technical Appendix 10.3, ES Volume 3A.

10.171 Owing to the current low level massing on the application site, minimal shadow is cast from the existing buildings on to the surrounding areas of open space.

10.172 On 21st March, 21st June and the 21st December, the surrounding sensitive amenity areas are unaffected by shadow cast from the existing buildings on-site in the baseline condition.

10.173 The full Sun Hours on Ground assessment can be found in Appendix 10.3, ES Volume 3A.

10.174 In the baseline condition, the relevant public amenity space to the north of the application site within the Juniper Crescent development will receive over two hours of sunlight per day on the 21st of March. All but one relevant private amenity space will receive two hours of sunlight on the 21st of March to over 50 % of the area.

Potential Impacts and Likely Effects

Demolition and Construction

10.175 The magnitude of impact and so resultant likely effect in relation to the daylight and sunlight amenity, overshadowing and solar glare for the surrounding properties and amenity areas would vary throughout the demolition and construction stage, depending on the level of obstruction caused. The impact would almost certainly be less than that of the completed proposed development, given that the extent of permanent massing would increase throughout the construction stage, until the buildings are completed.

10.176 On this basis, no further consideration is given in this assessment to effects to daylight, sunlight, overshadowing and solar glare as a result of the demolition and construction works.

10.177 The remainder of this chapter focuses on the effects relating to the completed proposed development.

Completed Development

10.178 The proposed development is expected to generate a range of potential significant direct daylight, sunlight, overshadowing and solar glare impacts, with likely permanent effects.

Daylight to Surrounding Sensitive Receptors

10.179 The full daylight assessment is presented within Technical Appendix 10.2 and is summarised in Table 10.7 and below.

10.180 A total of 365 windows serving 291 rooms were assessed for daylight within 33 buildings/properties. For VSC, 127 (35 %) out of the 365 windows assessed would meet the BRE criteria and for NSL, 141 (48 %) of the 291 rooms assessed would meet the BRE criteria.

10.181 The nine properties highlighted green within Table 10.5 would not experience a noticeable alteration (less than 20 %) in the levels of daylight it receives with the completed proposed development in place and it is considered that these properties would experience a negligible effect. The remaining properties would experience noticeable effects and are discussed further.

10.182 It must be noted that where the uses of the affected rooms are unknown, there is a possibility that some rooms are non-habitable i.e. bathrooms and hallways or are rooms considered less sensitive to daylight such as bedrooms within the BRE Guidelines.

Table 10.7: Summary of Daylight Results to Surrounding Sensitive Receptors

Address	VSC						NSL					
	Total No. of Windows	No. Windows that meet BRE criteria	Below BRE Guidelines				Total No. of Rooms	No. Rooms that meet 0.8 times former value criteria	Below BRE Guidelines			
			20-30% Reduction	30-40% Reduction	>40% Reduction	Total			20-30% Reduction	30-40% Reduction	>40% Reduction	Total
54-64 Juniper Crescent	16	10	0	5	1	6	8	7	1	0	0	1
69-78 Juniper Crescent	36	15	6	6	9	21	24	12	3	3	6	12
79 Juniper Crescent	4	1	0	3	0	3	3	1	2	0	0	2
80 Juniper Crescent	4	1	0	3	0	3	3	1	2	0	0	2
81 Juniper Crescent	4	1	0	2	1	3	3	1	2	0	0	2
82 Juniper Crescent	4	1	0	1	2	3	3	1	2	0	0	2
83 Juniper Crescent	4	1	0	0	3	3	3	1	1	1	0	2
84 Juniper Crescent	4	1	0	0	3	3	3	1	0	2	0	2
85-92 Juniper Crescent	16	0	0	0	16	16	16	2	8	6	0	14
93-100 Juniper Crescent	16	0	0	0	16	16	16	0	3	4	9	16
101 Juniper Crescent	4	1	0	0	3	3	3	2	0	0	1	1
102 Juniper Crescent	4	1	0	0	3	3	3	2	0	1	0	1
103 Juniper Crescent	4	1	0	2	1	3	3	2	1	0	0	1
104 Juniper Crescent	4	1	0	2	1	3	3	2	1	0	0	1
105 Juniper Crescent	4	2	2	0	0	2	3	3	0	0	0	0
106 Juniper Crescent	4	2	2	0	0	2	3	3	0	0	0	0
107 Juniper Crescent	4	3	1	0	0	1	3	3	0	0	0	0
108 Juniper Crescent	4	4	0	0	0	0	3	3	0	0	0	0
109 Juniper Crescent	6	6	0	0	0	0	3	3	0	0	0	0
110 Juniper Crescent	11	11	0	0	0	0	6	6	0	0	0	0
Gilbeys Yard (Block A)	76	5	6	14	51	71	66	35	2	3	26	31
Gilbeys Yard (Block B)	61	0	0	1	60	61	61	10	7	13	31	51
56 Gloucester Avenue	8	8	0	0	0	0	4	4	0	0	0	0
58 Gloucester Avenue	6	6	0	0	0	0	6	6	0	0	0	0
60 Gloucester Avenue	4	4	0	0	0	0	4	4	0	0	0	0
62 Gloucester Avenue	3	3	0	0	0	0	3	3	0	0	0	0
66 Gloucester Avenue	7	7	0	0	0	0	7	7	0	0	0	0

Table 10.7: Summary of Daylight Results to Surrounding Sensitive Receptors

Address	VSC						NSL					
	Total No. of Windows	No. Windows that meet BRE criteria	Below BRE Guidelines				Total No. of Rooms	No. Rooms that meet 0.8 times former value criteria	Below BRE Guidelines			
			20-30% Reduction	30-40% Reduction	>40% Reduction	Total			20-30% Reduction	30-40% Reduction	>40% Reduction	Total
90 Camden Lock Place	28	28	0	0	0	0	15	15	0	0	0	0
51 Chalk Farm Road	2	0	1	1	0	2	2	0	0	2	0	2
52 Chalk Farm Road	2	0	1	1	0	2	2	0	0	0	2	2
52a Chalk Farm Road	2	0	1	1	0	2	2	0	0	0	2	2
55 Chalk Farm Road	4	0	2	2	0	4	2	0	0	0	2	2
57a Chalk Farm Road	5	3	2	0	0	2	2	1	1	0	0	1
Total	**365**	**127**	**24**	**44**	**170**	**238**	**291**	**141**	**36**	**35**	**79**	**150**

54-64 Juniper Crescent

10.183 A total of 16 windows serving 8 rooms were assessed for daylight within these adjoining properties.

10.184 For VSC, 10 (63 %) of the 16 windows assessed would meet the BRE criteria and are considered to experience a negligible effect.

10.185 Of the six affected windows, five would experience alterations between 30-40 % which is considered moderate adverse (significant). The one remaining affected window would experience an alteration of 40.4 % which only just above the moderate adverse bracket of 30-40 % and is considered major adverse (significant). All six of the affected windows would however retain good VSC levels in excess of 22 % which are considered commensurate with the urban location of the application site.

10.186 Regarding NSL, seven (88 %) of the eight rooms assessed would meet the BRE criteria and are considered to experience a negligible effect.

10.187 The one affected room would experience an alteration between 20-30 % which is considered minor adverse and would retain a daylight distribution of 72 % which may be considered commensurate with the urban location of the application site.

10.188 Overall, owing to the retained daylight levels the effect to daylight within these adjoining properties would be **Minor Adverse** (not significant).

69-78 Juniper Crescent

10.189 A total of 37 windows serving 24 rooms were assessed for daylight within these properties.

10.190 For VSC, 16 (43 %) of the 37 windows assessed would meet the BRE criteria.

10.191 Of the 21 affected windows, six would experience alterations between 20-30 % which is considered minor adverse and six would experience alterations between 30-40 % which is considered moderate adverse (significant). The remaining nine affected windows would experience alterations in excess of 40 % which is considered major adverse (significant). All 21 of these windows would retain VSC levels in excess of 17 % which may be considered commensurate with the urban location of the application site.

10.192 Regarding NSL, 12 (50 %) of the 24 rooms assessed would meet the BRE criteria.

10.193 Of the 12 affected rooms, three would experience alterations between 20-30 % which is considered minor adverse (not significant). These three affected rooms would also retain daylight distribution levels in excess of 60 % which may be considered commensurate with the urban location of the application site. Three affected rooms would experience an alteration between 30-40 % which is considered moderate adverse (significant); however all three would retain daylight distribution levels in excess of 52 % which may be considered commensurate with the urban location of the application site.

10.194 The six remaining affected rooms would experience alterations in excess of 40 % which is considered major adverse (significant). Three of these rooms however would retain daylight distribution levels in excess of 54 % which may be considered commensurate with the urban location of the application site.

10.195 Overall, owing to the retained VSC and NSL levels the effect to daylight within these adjoining properties is considered to be **Moderate Adverse** (significant).

79 - 84 Juniper Crescent

10.196 A total of 24 windows serving 18 rooms were assessed within these adjoining residential properties.

10.197 For VSC, six (25 %) of the 24 windows assessed would meet the BRE criteria and are considered to experience a negligible effect (not significant).

10.198 Nine of the affected windows would experience alterations between 30-40 % which is considered moderate adverse; however all nine of these windows would retain in excess of 19 % VSC which may be considered commensurate with the urban location of the application site.

10.199 The nine remaining affected windows would experience alterations in excess of 40 % which is considered major adverse (significant), however eight of these affected windows would retain VSC levels in excess of 18 % which may be considered commensurate with the urban location of the application site.

10.200 In relation to NSL, six (33 %) of the 18 rooms assessed would meet the BRE criteria and are considered to experience a negligible effect (not significant).

10.201 Of the 12 affected rooms, nine would experience alterations between 20-30% which is considered minor adverse in significance, however all of these affected rooms would retain daylight distribution levels in excess of 69% which may be considered commensurate with the urban location of the application site.

10.202 The three remaining affected rooms would experience alterations between 30-40 % which is considered moderate adverse (significant), however all three of these rooms would retain daylight distribution

levels in excess of 60 % which may be considered commensurate with the urban location of the application site.

10.203 Overall, owing to the retained VSC and NSL levels, the effect to daylight within these adjoining residential properties would be **Minor Adverse** (not significant) to **Moderate Adverse** (significant).

85-92 Juniper Crescent

10.204 A total of 16 windows serving 16 rooms were assessed for daylight within this residential block.

10.205 For VSC, none of the 16 windows assessed would meet the BRE criteria.

10.206 All 16 affected windows would experience alterations in excess of 40 % which is considered major adverse (significant), however all 16 would retain at least 17 % VSC which may be considered commensurate with the urban location of the application site. In addition, all 16 of these windows are understood to serve bedrooms which are not considered as sensitive to daylight as living rooms within the BRE Guidelines.

10.207 For NSL, two (13 %) of the 16 rooms assessed would meet the BRE criteria.

10.208 Of the 14 affected rooms, eight would experience alterations between 20-30 % which is considered minor adverse and all eight would retain daylight distribution levels in excess of 69 % which may be considered commensurate with the urban location of the application site.

10.209 The remaining six affected rooms would experience alterations between 30-40% which is considered moderate adverse (significant); however, all six would retain daylight distribution in excess of 62 % which may be considered commensurate with the urban location of the application site. In addition, all six of these rooms are understood to serve bedrooms which are considered less sensitive to daylight than living rooms and kitchens within the BRE Guidelines.

10.210 Overall, owing to the commensurate retained VSC and NSL levels and the uses of the affected rooms, the effect to daylight within this residential block would be **Minor Adverse** (not significant) to **Moderate Adverse** (significant).

93-100 Juniper Crescent

10.211 A total of 16 windows serving 16 rooms were assessed for daylight within this residential block.

10.212 For VSC, none of the 16 windows assessed would meet the BRE criteria.

10.213 All 16 affected windows would experience alterations in excess of 40 % which is considered major adverse (significant); however 15 of these affected windows would retain VSC levels in excess of 15 % which may be considered commensurate with the urban location of the application site.

10.214 In addition, all 16 of the affected windows are understood to serve bedrooms which are considered less sensitive to daylight than living areas within the BRE Guidelines.

10.215 In relation to NSL, none of the 16 rooms assessed would meet the BRE criteria.

10.216 Three of the affected rooms would experience alterations between 20-30 % which is considered minor adverse and would retain daylight distribution levels in excess of 76 % which may be considered commensurate with the urban location of the application site.

10.217 Four of the affected rooms would experience alterations between 30-40% which is considered moderate adverse (significant); however all four rooms would retain daylight distribution levels in excess of 62 % which may be considered commensurate with the urban location of the application site.

10.218 The remaining nine affected rooms would experience alterations in excess of 40 % which is considered major adverse (significant); however seven of these rooms would retain daylight distribution levels in excess of 52 % which may be considered commensurate with the urban location of the application site.

10.219 In addition, all 16 of the affected rooms are understood to be bedrooms which are considered less sensitive to daylight than living rooms and kitchens within the BRE Guidelines.

10.220 Overall, owing to the retained VSC and NSL levels and the uses of the affected rooms, the effect to daylight within this residential block would be **Minor Adverse** (not significant) to **Moderate Adverse** (significant).

101 - 107 Juniper Crescent

10.221 A total of 28 windows serving 21 rooms were assessed for daylight within these adjoining residential properties.

10.222 For VSC, of the 28 windows assessed 11 (39 %) would meet the BRE criteria.

10.223 Of the 17 affected windows, five would experience alterations between 20-30 % which is considered minor adverse and would retain VSC levels in excess of 22 % which may be considered commensurate with the urban location of the application site.

10.224 Four of the remaining affected windows would experience alterations between 30-40 % which is considered moderate adverse (significant); however all four windows would retain VSC levels in excess of 19 % which may be considered commensurate with the urban location of the application site. In addition, three of these affected windows are understood to serve bedrooms which are considered less sensitive to daylight than living rooms and kitchens within the BRE guidelines.

10.225 The eight remaining affected windows would experience alterations in excess of 40 % which is considered major adverse (significant); however all eight of these windows would retain VSC levels in excess of 15 % which may be considered commensurate with the urban location of the application site.

10.226 In relation to NSL, 17 (81 %) of the 21 rooms assessed would meet the BRE criteria.

10.227 Two of the four affected rooms would experience alterations between 20-30 % which is considered minor adverse and would retain daylight distribution levels in excess of 72 % which may be considered commensurate with the urban location of the application site.

10.228 One of the remaining affected rooms would experience an alteration between 30-40 % which is considered moderate adverse (significant); however the rooms would retain a daylight distribution level of 64 % which may be considered commensurate with the urban location of the application site.

10.229 The remaining one affected room would experience an alteration in excess of 40 % which is considered major adverse (significant); however the room would retain a daylight distribution level of 55 % which may also be considered commensurate with the urban location of the application site.

10.230 Overall, owing to the commensurate retained VSC levels and high NSL compliance, the effect to daylight within this property would be **Minor Adverse** (not significant) to **Moderate Adverse** (significant).

Gilbeys Yard (Block A)

10.231 A total of 76 windows serving 66 rooms were assessed for daylight within this building.

10.232 For VSC, five (7 %) of the 76 windows would meet the BRE criteria and are considered to experience a negligible effect.

10.233 Of the 71 affected windows, six would experience alterations between 20-30 % which is considered minor adverse. 14 of the affected windows would experience alterations between 30-40 % which is considered moderate adverse (significant), however 12 of these would retain VSC levels in excess of 18 % which may be considered commensurate with the urban location of the application site. In addition, 11 of these affected windows serve kitchens and bedrooms which are not considered as sensitive to daylight as living rooms within the BRE guidelines.

10.234 The remaining 51 affected windows would experience alterations in excess of 40% which is considered major adverse (significant); however 40 of these windows would retain VSC levels in excess of 15 % which may also be considered commensurate with the urban location of the application site. In addition, 40 of the windows serve kitchens and bedrooms which are not considered as sensitive to daylight as living rooms within the BRE guidelines.

10.235 In relation to NSL, 35 (53 %) of the 66 rooms assessed would meet the BRE criteria and are considered to experience a negligible effect.

10.236 Of the 31 affected rooms, two would experience alterations between 20-30 % which is considered minor adverse. Three of the affected rooms would experience alterations between 30-40 % which is considered moderate adverse (significant); however all nine rooms would retain daylight distribution in excess of 61 % which may be considered commensurate with the urban location of the application site.

10.237 The remaining 26 rooms would experience alterations in excess of 40 % which is considered major adverse (significant), however five would retain daylight distribution in excess of 52 % which may be considered commensurate with the urban location of the application site.

10.238 Overall, owing to the retained levels of VSC and the uses of the majority of the affected rooms the effect to daylight within this building would be **Moderate Adverse** to **Major Adverse** (significant).

Gilbeys Yard (Block B)

10.239 A total of 61 windows serving 61 rooms were assessed within this building.

10.240 For VSC, none (0 %) of the windows assessed would meet the BRE criteria.

10.241 Of the 61 affected windows, one would experience an alteration between 30-40 % which is considered moderate adverse (significant); however it would retain a VSC level in excess of 20 % which may be considered commensurate with the urban location of the application site. In addition, this window is understood to serve a bedroom which is not considered as sensitive to daylight as a living room as stated within the BRE guidelines.

10.242 The remaining 60 affected windows would experience alterations in excess of 40 % which is considered major adverse (significant); however 41 of these windows would retain VSC levels in excess of 15 % which may be considered commensurate with the urban location of the application site. In addition, all 60 of these affected windows are understood to serve kitchens and bedrooms which are not considered as sensitive to daylight as living rooms within the BRE guidelines.

10.243 Regarding NSL, 10 (16 %) out of the 64 rooms assessed would meet the BRE criteria and are considered to experience a negligible effect.

10.244 Of the 54 affected rooms, seven would experience alterations between 20-30 % which is considered minor adverse (not significant). In total 13 of the affected rooms would experience alterations between 30-40 % which is considered moderate adverse (significant); however all 13 would retain daylight distribution levels in excess of 56 % which may be considered commensurate with the urban location of the application site.

10.245 The remaining 31 affected rooms would experience alterations in excess of 40 % which is considered major adverse (significant); however six of these would retain daylight distribution levels in excess of 50 % which may be considered commensurate with the urban location of the application site.

10.246 Overall owing to the uses of the affected rooms and the retained levels, the effect to daylight within this building would be **Moderate Adverse** (significant) to **Major Adverse** (significant).

51 Chalk Farm Road

10.247 A total of two windows serving two rooms were assessed for daylight within this property.

10.248 For VSC, neither of the windows assessed would meet the BRE criteria.

10.249 One of the affected windows assessed would experience an alteration of 28 % which is considered minor adverse. The remaining one affected window would experience an alteration of 31 % which is considered moderate adverse (significant); however it is marginally above the minor adverse bracket of 20-30 % alterations. Both of the windows would however retain VSC levels of 26 % and 24 % respectively, which are considered good retained levels and commensurate with the urban location of the application site.

10.250 Regarding NSL, neither of the rooms assessed would meet the BRE criteria.

10.251 Both of the affected rooms would experience alterations between 30-40 % which is considered moderate adverse (significant); however both rooms would retain daylight distribution levels in excess of 57 % which may be considered commensurate with the urban location of the application site.

10.252 Overall, owing to high retained VSC and NSL levels, the effect to daylight within this property would be **Minor Adverse** (not significant).

52 Chalk Farm Road

10.253 A total of two windows serving two rooms were assessed for daylight within this property.

10.254 For VSC, neither of the windows assessed would meet the BRE criteria.

10.255 One of the affected windows assessed would experience an alteration of 28 % which is considered minor adverse in significance (not significant). The remaining one affected window would experience an alteration of 31 % which is considered moderate adverse (significant) however it is marginally above the minor adverse bracket of 20-30 % alterations. However, both of the windows would retain VSC levels of 26 % and 25 % respectively, which are considered good retained levels and commensurate with the urban location of the application site.

10.256 Regarding NSL, neither of the rooms assessed would meet the BRE criteria.

10.257 Both of the affected rooms would experience alterations in excess of 40 % which is considered major adverse (significant), one of these rooms however would retain a daylight distribution level in excess of 55 % which may be considered commensurate with the urban location of the application site.

10.258 Overall, owing to the high levels of VSC retained by the windows, the effect to daylight within this property would be **Minor** (not significant) to **Moderate Adverse** (significant).

52a Chalk Farm Road

10.259 A total of two windows serving two rooms were assessed for daylight within this property.

10.260 For VSC, neither of the windows assessed would meet the BRE criteria.

10.261 One of the affected windows assessed would experience an alteration of 29 % which is considered minor adverse (not significant). The remaining one affected window would experience an alteration of 32 % which is considered moderate adverse (significant). However, both of the windows would retain VSC levels of 26 % and 25 % respectively, which are considered good retained levels and commensurate with the urban location of the application site.

10.262 Regarding NSL, neither of the rooms assessed would meet the BRE criteria.

10.263 Both of the rooms would experience alterations in excess of 40 % which is considered major adverse (significant); however one of these rooms would retain a daylight distribution level of 50 % which may be considered commensurate with the urban location of the application site.

10.264 Overall, owing to high levels of retained VSC, the effect to daylight within this property would be **Minor Adverse** (not significant) to **Moderate Adverse** (significant).

55 Chalk Farm Road

10.265 A total of four windows serving two rooms were assessed for daylight within this property.

10.266 For VSC, none of the four windows assessed would meet the BRE criteria.

10.267 Two of the affected windows would experience alterations between 20-30 % which is considered minor adverse and both windows would retain VSC levels in excess of 26 % which is marginally below the 27

% recommended within the BRE Guidelines. The two remaining affected windows would experience alterations of 31 % which is considered moderate adverse (significant); however both are only marginally above the minor adverse bracket of 20-30 % alterations. These two windows would also retain VSC levels of 25 % which is considered a good retained level that are commensurate with the urban location of the application site.

10.268 Regarding NSL, neither of the two rooms assessed would meet the BRE criteria.

10.269 Both of the affected rooms would experience alterations in excess of 40 % which is considered major adverse (significant). It must be noted that the uses of the affected rooms are unknown and there is a possibility that some rooms are non-habitable i.e. bathrooms and hallways or are considered less sensitive to daylight such as bedrooms.

10.270 Overall, the effect to daylight within this property would be **Minor Adverse** (not significant) to **Moderate Adverse** (significant).

57a Chalk Farm Road

10.271 A total of five windows serving two rooms have been assessed for daylight within this property.

10.272 For VSC, three (60 %) of the five affected windows would meet the BRE criteria and are considered to experience a negligible effect.

10.273 The two affected windows would experience alterations between 20-30 % which is considered minor adverse. These affected windows would also retain good levels of VSC in excess of 26 % that are only just below the 27 % recommended within the BRE Guidelines and are considered commensurate with the urban location of the application site.

10.274 Regarding NSL, one (50 %) of the two rooms assessed for daylight would meet the BRE criteria and are considered to experience a negligible effect.

10.275 The one affected room would experience an alteration of 22 % which is considered minor adverse and is only just above the maximum acceptable alteration of 20 % as suggested within the BRE Guidelines. In addition the room retains a daylight distribution level of 76 % which is marginally below the 80 % recommended within the BRE Guidelines.

10.276 Overall, the effect to daylight within this property would be **Minor Adverse** (not significant).

Sunlight to Surrounding Sensitive Receptors

10.277 The full sunlight assessment is presented within Technical Appendix 10.2 and is summarised within Table 10.8 and the following commentary.

10.278 A total of 159 windows have been assessed for sunlight within 25 of the surrounding sensitive receptors. Of the 159 windows assessed, 151 (95 %) would meet the BRE criteria for both winter and total APSH.

10.279 The 20 properties highlighted green within Table 10.6 would not experience noticeable alterations (below 20 %) in sunlight levels and would experience a negligible effect with the completed proposed development in place. The remaining properties are considered to experience noticeable alterations in sunlight levels and are discussed further.

Table 10.8: Summary of Sunlight Results to Surrounding Sensitive Receptors

Address	Total No. Windows	Meet BRE Guidelines Total & Winter	Windows which do not meet BRE criteria					
			Below threshold for Winter APSH			Below threshold for Total APSH		
			20-30% Reduction	30-40% Reduction	>40% Reduction	20-30% Reduction	30-40% Reduction	>40% Reduction
69-78 Juniper Crescent	27	27	0	0	0	0	0	0
79 Juniper Crescent	4	4	0	0	0	0	0	0
80 Juniper Crescent	4	4	0	0	0	0	0	0
81 Juniper Crescent	4	4	0	0	0	0	0	0
82 Juniper Crescent	4	4	0	0	0	0	0	0
83 Juniper Crescent	4	3	0	0	1	0	0	0
84 Juniper Crescent	4	1	0	0	3	0	0	0
85-92 Juniper Crescent	16	16	0	0	0	0	0	0
93-100 Juniper Crescent	16	15	0	0	1	0	0	0
101 Juniper Crescent	4	4	0	0	0	0	0	0
102 Juniper Crescent	4	4	0	0	0	0	0	0
103 Juniper Crescent	4	4	0	0	0	0	0	0
104 Juniper Crescent	4	3	0	0	1	0	0	0
105 Juniper Crescent	4	4	0	0	0	0	0	0
106 Juniper Crescent	4	4	0	0	0	0	0	0
107 Juniper Crescent	4	4	0	0	0	0	0	0

Table 10.8: Summary of Sunlight Results to Surrounding Sensitive Receptors

Address	Total No. Windows	Meet BRE Guidelines Total & Winter	Windows which do not meet BRE criteria					
			Below threshold for Winter APSH			Below threshold for Total APSH		
			20-30% Reduction	30-40% Reduction	>40% Reduction	20-30% Reduction	30-40% Reduction	>40% Reduction
108 Juniper Crescent	4	4	0	0	0	0	0	0
109 Juniper Crescent	6	6	0	0	0	0	0	0
110 Juniper Crescent	11	11	0	0	0	0	0	0
90 Camden Lock Place	12	10	0	0	0	0	1	1
51 Chalk Farm Road	2	2	0	0	0	0	0	0
52 Chalk Farm Road	2	2	0	0	0	0	0	0
52a Chalk Farm Road	2	2	0	0	0	0	0	0
55 Chalk Farm Road	4	4	0	0	0	0	0	0
57a Chalk Farm Road	5	5	0	0	0	0	0	0
Total	**159**	**151**	**0**	**0**	**6**	**0**	**1**	**1**

83 Juniper Crescent

10.280 A total of four windows were assessed for sunlight within this residential property.

10.281 Of the four windows assessed, three (75 %) would meet the BRE criteria for both winter and total APSH and would be considered to experience a negligible effect.

10.282 The one affected window would experience an alteration in excess of 40 % in winter APSH which is considered major adverse (significant) but the window would meet the BRE criteria for total APSH achieving well in excess of the 25 % recommended within the BRE Guidelines. In addition, the window would retain 4 % in winter APSH which is only just below the 5 % recommended within the BRE Guidelines and may be considered commensurate with the urban location of the application site.

10.283 Overall, due to the retained levels the effect to sunlight within this residential property is consider would be **Minor Adverse** (not significant).

84 Juniper Crescent

10.284 A total of four windows were assessed for sunlight within this residential property.

10.285 Of the four windows assessed, one (25 %) would meet the BRE criteria for both winter and total APSH and would be considered to experience a negligible effect.

10.286 The three affected windows would all experience alterations in excess of 40 % in winter APSH which is considered major adverse (significant) but would meet the BRE criteria for total APSH achieving in excess of the 25 % recommend within the BRE guidelines. However, two of these affected windows would retain winter APSH levels of 4 % which is only just below the 5 % recommended within the BRE Guidelines and may be considered commensurate with the urban location of the application site.

10.287 It must be noted that one of the affected windows serves a kitchen and two of the affected windows serve bedrooms which are considered less sensitive to sunlight conditions than living rooms within the BRE Guidelines.

10.288 Overall, owing to the room uses, high total APSH compliance and retained winter APSH levels the effect to sunlight within this property would be **Minor Adverse** (not significant).

93-100 Juniper Crescent

10.289 A total of 16 windows were assessed for sunlight within this residential building.

10.290 Of the 16 windows assessed, 15 (94 %) would meet the BRE criteria for both winter and total APSH and would be considered to experience a negligible effect.

10.291 The one affected window would experience an alteration in winter APSH in excess of 40 % which is considered major adverse (significant) but would meet the BRE criteria for total APSH achieving in excess of the 25 % recommended within the BRE Guidelines. The one affected window serves a bedroom which is not considered as sensitive to sunlight as living rooms within the BRE Guidelines.

10.292 Overall, considering the high level of APSH compliance and the one affected window achieving good total APSH and serving a bedroom, the effect to sunlight within this residential building would be **Minor Adverse** (not significant).

104 Juniper Crescent

10.293 A total of four windows were assessed for sunlight within this residential property.

10.294 Of the four windows assessed, three (75 %) would meet the BRE criteria for both winter and total APSH and would be considered to experience a negligible effect.

10.295 The one affected window would experience an alteration in excess of 40 % in winter APSH which is considered major adverse (significant) but would meet the BRE criteria for total APSH achieving well in excess of the 25 % recommended within the BRE Guidelines. However, the window would retain a winter APSH level of 4 % which is only just below the 5 % recommended within the BRE Guidelines and may be considered commensurate with the urban location of the application site.

10.296 Overall, the effect to sunlight within this property is considered to be **Minor Adverse** (not significant).

90 Camden Lock Place

10.297 A total of 12 windows were assessed for sunlight within this residential property.

10.298 Of the 12 windows assessed, 10 (83 %) would meet the BRE criteria for both winter and total APSH and would be considered experience a negligible effect.

10.299 One of the affected windows would experience an alteration in excess of 40 % which is considered major adverse (significant) in total APSH but would meet the BRE criteria for winter APSH. The remaining affected window would experience an alteration between 30-40 % for total APSH which is considered moderate adverse (significant) and would meet the BRE criteria for winter APSH. However both windows have low existing levels of winter and total APSH below the recommend 5 % in winter and 25% in total, whereby any alteration would result in a disproportionate percentage change.

10.300 In addition, the uses of the rooms the affected windows serve are unknown and there is a possibility that they serve rooms considered less sensitive to sunlight than living rooms such as bedrooms.

10.301 Overall, the effect to sunlight within this property would be **Minor Adverse** (not significant).

Overshadowing

10.302 The full transient overshadowing assessment for the proposed development is presented within Technical Appendix 10.3 and the results are discussed in detail in the following commentary.

21st March

10.303 On this day, a small area of shadow is cast on to the communal gardens and play area on Juniper Crescent from 10:00GMT; however this shadow does not stay in one place and moves across the area of open space in a clockwise direction. By 13:00GMT shadow is no longer cast from the MS parcel onto this amenity area.

10.304 From 10:00GMT shadow is cast from the MS parcel on to the several of the private gardens serving Juniper Crescent properties. This shadow however continues to move throughout the day in a clockwise direction and by 14:00GMT only the private gardens serving 69-83 Juniper Crescent remain in shadow. By 15:00GMT the shadow from the MS parcel has moved completely from the private gardens serving Juniper Crescent properties.

10.305 The amenity areas remain unaffected by the proposed development for the remainder of the day and the PFS parcel of the application site does not cause any overshadowing on to surrounding amenity areas on this day.

21st June

10.306 On 21st June, shadows are shorter in length due to the higher position of the sun during the summer period.

10.307 From 09:00GMT shadow is cast from the MS parcel on to several gardens to the south end of the Juniper Crescent this shadow moves northwards along the private gardens until 14:00GMT when only the private gardens on the northern end of Juniper Gardens experience shadow from the proposed development. By 15:00GMT the private gardens serving the Juniper Crescent properties are no longer affected by shadow cast from the proposed development.

10.308 The private gardens serving the Juniper Crescent properties remain unaffected by shadow from the proposed development for the remainder of the day.

10.309 The communal garden and play area on Juniper Crescent is completely unaffected by shadow from the proposed development and the PFS parcel of the application site does not cause any overshadowing on to surrounding amenity areas on this day.

21st December

10.310 On 21st December, the sun's altitude is particularly low; therefore, relatively low obstructions create long shadows.

10.311 In the morning between 09:00GMT and 12:00GMT a small amount of shadowing is cast from the MS parcel on to the communal gardens and play area on Juniper Crescent. This open space however is already heavily overshadowed by the existing surrounding building and shadow from the properties on Juniper crescent overlap the shadow cast from the proposed development. From 13:00GMT onwards this amenity area is no longer affected by shadow cast from the proposed development.

10.312 On this day, the private gardens serving Juniper Crescent properties are already heavily overshadowed by the brick walls located at the end of the gardens and therefore the gardens are unaffected and no additional overshadowing from the proposed development is cast on to the gardens.

10.313 Overall, the effects of overshadowing from the proposed development on to the surrounding private and public amenity spaces would be **Minor Adverse** (not significant).

Sun Hours On Ground

10.314 The full Sun Hours on Ground assessment is presented within Technical Appendix 10.3 and is summarised in the following commentary.

10.315 A total of 21 amenity areas have been assessed for Sun Hours on Ground on Juniper Crescent. Of these amenity areas 20 would meet the BRE criteria and would receive at least two hours of direct sunlight on March 21st. In addition the communal gardens and play area on Juniper Crescent (Area A1) would achieve 100 % of the area receiving at least two hours of sunlight on the 21st March.

10.316 The one affected amenity area (Area A13), which is a private garden, would not meet the BRE criteria; however in the existing scenario the amenity area does not meet the 50% of the area receiving at least 2 hours of direct sunlight as recommended within the BRE Guidelines.

10.317 Overall, the effect to the sun hours on ground of the surrounding amenity areas would be **Minor Adverse** in significance (not significant).

Solar Glare

10.318 The full Solar Glare assessment is presented within Appendix 10.4 and is summarised in the following commentary.

10.319 A Solar Glare study has been undertaken for every relevant road junctions and rail signals in close proximity of the proposed development as shown in Figure 10.4 of this chapter. As the proposed office building is predominantly glazed, the assessment focused on the important traffic signals along Chalk Farm Road and train signals along nearby train lines where the proposed office building is mostly visible.

10.320 In relation to the viewpoints identified on Chalk Farm Road, five traffic lights at three junctions and a pedestrian crossing were assessed in the east direction of the Road.

10.321 Road viewpoints Rd2a, Rd4 and Rd7 would experience no or very minor potential instances of solar reflection and would therefore result in a **Negligible** solar glare effect (not significant). The remaining viewpoints would experience noticeable or significant instances of solar reflection and are considered in more detail below.

10.322 In the eastern direction solar reflections would be visible from the north facade of the office building early in the morning during summer and mid-season. At the closest road junction (view point Rd3) sun reflections would be noticed from the western façade of the building in the summer afternoons. These reflections would occur within 30° of the drivers' line of sight. However, most of the reflection would be above the 5° visor cut-off and could be mitigated with the driver's use of a visor.

10.323 Instances of glare would occur from the eastern elevation of the PFS in the morning during mid-season periods. However, this facade is broken up vertically by louvers and therefore, any glare would therefore be minimised.

10.324 From the closest junction travelling westwards along Chalk Farm Road (viewpoint Rd6a), solar reflections would be visible within 3° of the driver's line of sight in the late afternoon in the summer.

10.325 No instances of reflection given off the offices from the PFS Block are visible at any other assessed view points on the surrounding roads assessed. Small instances of reflection given off the residential buildings could be visible however they would be small in size and short in duration owing to the façade design which features punched windows rather than large areas of glazing.

10.326 For the viewpoints assessed along the railway, two viewpoints (Tr1_1 and Tr1_2) would experience no or very minor instances of solar reflection and therefore a **Negligible** solar glare effect (not significant). The remaining train line viewpoints would experience noticeable or significant potential instances of solar reflection and are considered in more detail below.

10.327 Two train tracks were considered relevant for the Solar Glare assessments. Track 1 runs from Euston Train Station passing through the south of the MS parcel. Track 2 is the overground railway which runs between Camden Road and Kentish Town West Stations and is located between the MS parcel and the PFS parcel. In both tracks static viewpoints were located if judged relevant, such as before an existing signal, to illustrate any potential instance of solar reflection.

10.328 Tracks from and to Euston Train Station: Track 1 (Southbound) – No large instances of reflection within this view angle would be noticed.

10.329 Tracks from and to Euston Train Station: Track 2 (Northbound) – Instances of reflection would occur in between 10° and 30° of the driver's line of sight, however, these reflections would be broken by the features such as brick sections and punched windows on the facades of the proposed development. Therefore, these reflections are considered not to be of significance.

10.330 Track 3 (Eastbound between Camden Road and Kentish Town West Stations) – In the evenings of summer and mid-season periods, instances of solar reflections would be visible between 5° and 30° of the driver's line of sigh;, however, the majority of the solar reflection at this track can be mitigated by the driver's use of a visor. Solar reflections caused by Block C would also be visible within 5° of the driver's line of sight in the early mornings from late March to late April and from late August to late September.

10.331 Track 4 (Westbound between Camden Road and Kentish Town West Stations) – Between 8 and 10 am, from September to November and January to March instances of reflections are visible at some viewpoints along this track. A greater portion of this reflection can be avoided by the use of a visor.

10.332 Overall, the effect of solar glare from the proposed development at most of the viewpoints is considered to be **Minor Adverse**; however, viewpoints Rd3, Rd6a, Tr3_3, Tr3_6, Tr3_7, Tr3_8, Tr4_3 and Tr4_4 would be **Major Adverse** (significant).

Light Pollution

10.333 Light Pollution assessments have not been undertaken for existing receptors as none have been identified as being within close enough proximity (20m) to be affected by the proposed development.

Mitigation and Residual Effects

Demolition and Construction

10.334 The potential daylight, sunlight, overshadowing, solar glare and light pollution effects during demolition and construction would gradually increase in magnitude as the massing of the development increases. When considering the construction of the proposed development, the effects would be noticeable; however, such effects would be less than that of the completed development. No mitigation would be required.

Completed Development

Daylight and Sunlight

10.335 Regarding the effects on daylight to the nearby buildings and properties that are considered to be sensitive, the proposed development would result in Negligible to Moderate to Major Adverse effects to many of the properties/buildings with instances of Minor to Moderate Adverse and Moderate Adverse effects. For sunlight, all of the surrounding sensitive buildings and properties would experience a Negligible or Minor Adverse effect. Given the urban context of the application site such effects are likely to be unavoidable in relation to new development.

10.336 Owing to the current low level massing on the application site, such effects are unavoidable in relation to any substantial and viable new development proposed on the application site. It must be taken into consideration that the surrounding residents currently see high levels of daylight and sunlight that are not consistent with the levels usually seen within an urban location. Any massing proposed on the application site that would exceed the parameters of the existing massing currently on-site would result in disproportionate percentage alterations in the daylight and sunlight levels experienced by the nearby sensitive receptors.

10.337 In terms of daylight and sunlight, during the design process measures were implemented to minimise the impacts on daylight to surrounding sensitive receptors as much as possible while still ensuring the provision of a viable scheme and therefore no additional mitigation is available. Consequently the residual effect for daylight would remain as:

- **Negligible to Minor Adverse** to 12 properties;
- **Minor** to **Moderate Adverse** to seven properties;
- **Moderate Adverse** to one property; and
- **Moderate to Major Adverse** to two properties.
- The residual sunlight effects would remain as **Negligible** to **Minor Adverse**.

10.338 A standalone 'Contextual Density and Daylight Research' report has been carried out alongside the daylight and sunlight analysis for this chapter. Although the proposed development is predicted to result in moderate to major adverse effects in terms of daylight and sunlight these should be considered in the urban context of Camden Town Centre and Camden Borough as a whole. The standalone research report draws comparisons with existing daylight levels in the area, as well as those of nearby consented scheme. Owing to this research and based on professional judgment, the significant effects above are not considered to be a material consideration in the overall planning balance.

Transient Overshadowing

10.339 In relation to overshadowing, the proposed development would result in minor adverse effects to the nearby sensitive amenity areas and therefore no mitigation measures are considered necessary. The residual overshadowing effect would remain as **Minor Adverse** (not significant).

Sun Hours on Ground

10.340 The public amenity area to the north of the application site within Juniper Crescent would experience no alteration to the area receiving 2 hours of sunlight on the 21st of March.

10.341 With regard to the private amenity areas, within Juniper Crescent, there is only one garden that would not meet the BRE Guidelines. This amenity area would experience a 35 % reduction in area receiving 2 hours of sun on the 21st of March as a result of the proposed development. The sunlight to this area is already occluded by a high wall which borders the garden to the south. The residual impact to the Sun Hours of ground remains **Minor Adverse** (not significant).

Solar Glare

10.342 The effects of solar glare from the proposed development range from Negligible to Minor Adverse in significance with eight instances of Major Adverse at viewpoints Rd3, Rd6a, Tr3_3, Tr3_6, Tr3_7, Tr3_8, Tr4_3 and Tr4_4.

10.343 The assessments undertaken assume a worst-case scenario whereby the sun will shine every day during daylight hours which is not the case within the UK or London.

10.344 Where solar reflections have the potential to cause a Major Adverse effect at viewpoints Rd3, Rd6a, Tr3_3, Tr3_6, Tr3_7, Tr3_8, Tr4_3 and Tr4_4 on the northern and southern facades of the PFS block, proven effective mitigation measures such as external shading with fins or louvres would be incorporated into the design of these particular façades at the detailed design stage. The fins and louvres would act to obscure the solar rays and prevent instances of solar reflection from the glazing and consequently reduce solar glare effects.

10.345 Following professional judgement and previous experience from schemes of a similar nature with comparable solar glare effects, the incorporation of these mitigation measures on to the relevant facades at detailed design stage would reduce the potential for solar reflections to occur and cause solar glare effects. Therefore the significance of the residual effect would be **Negligible**.

Summary of Mitigation and Residual Effects

10.346 Table 10.9 and Table 10.10 provide a tabulated summary of the outcomes of the Daylight, Sunlight and Overshadowing, Solar Glare and Light Pollution Impact Assessment of the proposed development.

Table 10.9: Summary of Proposed Mitigation and Enhancement Measures

Likely Effects Identified	Proposed Mitigation / Enhancement Measures
Demolition and Construction	
Change in Daylight levels	None required
Change in Sunlight levels	None required
Change in Overshadowing levels	None required
Creation of Solar Glare	None required
Creation of Light Pollution	None required
Completed Development	
Change in Daylight levels	None available
Change in Sunlight levels	None available
Change in Overshadowing levels	None required
Creation of Solar Glare	External shading with fins or louvres on the northern and southern facades of the PFS Block to be secured by means of an appropriately worded planning condition.
Creation of Light Pollution	Not Applicable.

Table 10.10: Summary of Residual Effects

Receptor	Description of Residual Effect	Nature of Residual Effect*					
		Significance**	+ -	D I	P T	R IR	St Mt Lt
Demolition and Construction							
Surrounding Residential Receptors	Change in Daylight levels	Evolving and less than completed development	N/A	D	T	IR	St
Surrounding Residential Receptors	Change in Sunlight levels	Evolving and less than completed development	N/A	D	T	IR	St
Surrounding amenity areas	Change in Overshadowing levels	Evolving and less than completed development	N/A	D	T	IR	St
Train drivers	Creation of Solar Glare	Evolving and less than completed development	N/A	D	T	IR	St
Road users	Creation of Solar Glare	Evolving and less than completed development	N/A	D	T	IR	St
Completed Development							
Surrounding Residential Receptors	Change in Daylight levels	Negligible to minor adverse to 12 properties, minor to moderate adverse to seven properties, Moderate adverse to one property and Moderate to Major Adverse to two properties.	-	D	P	IR	Lt
Surrounding Residential Receptors	Change in Sunlight levels	Negligible to Minor Adverse	-	D	P	IR	Lt
Surrounding amenity areas	Change in Overshadowing levels	Minor Adverse	-	D	P	IR	Lt
Train drivers	Creation of Solar Glare	Negligible	-	D	P	IR	Lt
Road users	Creation of Solar Glare	Negligible	-	D	P	IR	Lt

Notes:
* - = Adverse/ + = Beneficial; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St- Short term/ Mt –Medium term/ Lt –Long term.
**Negligible/Minor/Moderate/Major

Likely Significant Environmental Effects

10.347 For daylight, many of the sensitive receptors assessed are not likely to experience significant effects with the proposed development in place. There are however 11 surrounding sensitive receptors that are considered likely to experience significant effects in relation to the completed proposed development. The two most significantly affected buildings being Gilbeys Yard (Block A) and Gilbeys Yard (Block B) which would experience a **Moderate to Major Adverse** effect.

10.348 Although significant daylight effects are predicted at several of the surrounding sensitive receptors, given that the application site is in an urban location, the current levels of daylight and sunlight cannot be expected to be maintained, and the expectation of daylight amenity in this area is likely to be lower.

The existing site is currently considered to have a low level massing. Owing to this, significant effects are unavoidable in relation to any substantial and viable new development proposed on the application site.

10.349 It must be taken into consideration that the surrounding sensitive receptors currently see high levels of daylight that are not consistent with the levels usually seen within an urban location. Any massing proposed on the application site that would exceed the parameters of the existing massing currently on-site would result in disproportionate percentage alterations in the daylight levels experienced by the nearby sensitive receptors. As emphasised within the Housing SPG (2016) for London, an appropriate degree of flexibility should be applied when using the BRE guidelines and factors such as local circumstances and the need to optimise housing capacity should be taken in to consideration.

10.350 In relation to sunlight, there are no significant effects considered likely to the surrounding sensitive receptors.

10.351 For transient overshadowing, there are no significant effects considered likely to the surrounding sensitive amenity areas.

10.352 The effects of solar glare from the proposed development range from Negligible to Minor Adverse in significance once mitigation in the form of fins or louvres on the northern and southern facades of the PFS Block have been taken into account.

10.353 For the Sun Hours on Ground there are no significant effects considered likely to the surrounding sensitive amenity areas.

Cumulative Effects

10.354 The following schemes in close proximity to the application site with residential receptors have been included within the cumulative assessments:

- 100, 100a, 100b Chalk Farm Road; and
- 44-44a Gloucester Avenue.

Demolition and Construction

10.355 The construction of the new buildings on the application site would have a gradual effect upon the levels of daylight, sunlight, overshadowing and light pollution as the massing of the proposed development and cumulative schemes increase over time.

10.356 The assessment of the effects of the completed and occupied proposed development provides a 'worst case' assessment of construction effects. Therefore, reference should be made to the assessments of the fully built out proposed development and cumulative schemes which are discussed in the sections below.

Completed Development

Daylight to Surrounding Receptors

10.357 The full cumulative daylight assessment is presented within Technical Appendix 10.3 and is summarised in Table 10.11.

10.358 The 25 buildings/properties within Table 10.9 would not experience any noticeable changes in daylight levels with the proposed development and cumulative schemes in place compared to the proposed development in isolation.

10.359 The remaining buildings, highlighted in orange in the table below, would experience significant differences in daylight levels and are discussed in more detail below.

Table 10.11: Summary of Cumulative Daylight Effects

Address	Totals		Cumulative		Proposed Development	
	Total No. of Windows	Total No. of Rooms	No. Windows that meet BRE criteria	No. Rooms that meet the 0.8 times former value criteria	No. Windows that meet BRE criteria	No. Rooms that meet the 0.8 times former value criteria
54-64 Juniper Crescent	16	8	5	7	10	7
69-78 Juniper Crescent	36	24	15	12	15	12
79 Juniper Crescent	4	3	1	1	1	1
80 Juniper Crescent	4	3	1	1	1	1
81 Juniper Crescent	4	3	0	1	1	1
82 Juniper Crescent	4	3	0	1	1	1
83 Juniper Crescent	4	3	0	1	1	1
84 Juniper Crescent	4	3	0	1	1	1
85-92 Juniper Crescent	16	16	0	2	0	2
93-100 Juniper Crescent	16	16	0	0	0	0
101 Juniper Crescent	4	3	0	2	1	2
102 Juniper Crescent	4	3	0	2	1	2
103 Juniper Crescent	4	3	0	2	1	2
104 Juniper Crescent	4	3	1	2	1	2

Table 10.11: Summary of Cumulative Daylight Effects

Address	Totals		Cumulative		Proposed Development	
	Total No. of Windows	Total No. of Rooms	No. Windows that meet BRE criteria	No. Rooms that meet the 0.8 times former value criteria	No. Windows that meet BRE criteria	No. Rooms that meet the 0.8 times former value criteria
105 Juniper Crescent	4	3	2	3	2	3
106 Juniper Crescent	4	3	2	3	2	3
107 Juniper Crescent	4	3	3	3	3	3
108 Juniper Crescent	4	3	4	3	4	3
109 Juniper Crescent	6	3	6	3	6	3
110 Juniper Crescent	11	6	11	6	11	6
Gilbeys Yard (Block A)	76	66	5	35	5	35
Gilbeys Yard (Block B)	61	61	0	10	0	10
56 Gloucester Avenue	8	4	8	4	8	4
58 Gloucester Avenue	6	6	6	6	6	6
60 Gloucester Avenue	4	4	4	4	4	4
62 Gloucester Avenue	3	3	3	3	3	3
66 Gloucester Avenue	7	7	7	7	7	7
90 Camden Lock Place	28	15	28	15	28	15
51 Chalk Farm Road	2	2	0	0	0	0
52 Chalk Farm Road	2	2	0	0	0	0
52a Chalk Farm Road	2	2	0	0	0	0
55 Chalk Farm Road	4	2	0	0	0	0
57a Chalk Farm Road	5	2	3	1	3	1
Total	**365**	**291**	**115**	**141**	**127**	**141**

54-64 Juniper Crescent

10.360 A total of 16 windows serving eight rooms were assessed for daylight within this residential block.

10.361 In the cumulative scenario, five (31 %) of the 16 windows assessed would meet the BRE criteria for VSC and seven (88 %) of the eight rooms assessed would meet the BRE criteria for NSL. However, the affected windows would retain VSC levels in excess of 19 % which may be considered commensurate with the urban location of the application site.

10.362 Overall, the effect on daylight to this residential building would be **Minor Adverse** (not significant) to **Moderate Adverse** (significant). This is a decrease in compliant daylight levels within the property when compared to the proposed development in isolation; the reductions are due to the nearby 100, 100a, 100b Chalk Farm Road cumulative scheme rather than the proposed development in isolation.

81 - 84 Juniper Crescent

10.363 A total of 16 windows serving 12 rooms were assessed within these residential properties.

10.364 In the cumulative scenario, none of the 16 windows assessed would meet the BRE criteria for VSC and four (33 %) of the 12 rooms assessed would meet the BRE criteria for NSL. All but one of the affected windows would retain in excess of 15 % VSC which may be considered commensurate with the urban location of the application site.

10.365 Overall, the effect on daylight to these residential properties is considered to be **Moderate Adverse** (significant). This is a decrease in compliant daylight levels within the properties when compared to the proposed development in isolation; the reductions are due to the nearby 100, 100a, 100b Chalk Farm Road cumulative scheme rather than the proposed development in isolation.

101 - 103 Juniper Crescent

10.366 A total of 12 windows serving nine rooms were assessed for daylight within these residential properties.

10.367 In the cumulative scenario, none of the 12 windows assessed would meet the BRE criteria for VSC and six (67 %) of the nine rooms assessed would meet the BRE criteria for NSL. All of the affected windows however would retain VSC levels in excess of 15 % VSC which may be considered commensurate with the urban location of the application site.

10.368 Overall, the effect on daylight to these residential properties would be **Moderate Adverse** (significant). This is a decrease in compliant daylight levels within the properties when compared to the proposed development scenario; the reductions are due to the nearby 100, 100a, 100b Chalk Farm Road cumulative scheme rather than the proposed development in isolation.

Daylight to Surrounding Consented Residential Receptors

10.369 An assessment of the impacts from the proposed development on to the nearby cumulative schemes has been carried out and is summarised in Table 10.12 with the following commentary. The full daylight assessment on 100 Chalk Farm Road is presented in Appendix 10.2.

10.370 As presented in Table 10.12, 44-44a Gloucester Avenue would not experience any noticeable changes to ADF levels with the proposed development in place and the effect of the proposed development on this cumulative scheme would be **Negligible**.

Table 10.12: Summary of Daylight Impacts on Cumulative Schemes

Address	ADF		
	Total No. of Rooms	No. Rooms that meet BRE criteria	No. of Rooms that do not meet the BRE criteria
44-44a Gloucester Avenue	17	17	0
100 Chalk Farm Road	67	40	27

100 Chalk Farm Road

10.371 A total of 67 rooms assessed for daylight within this consented residential property. 40 of the 60 rooms assessed would meet the BRE criteria for ADF.

10.372 14 of the rooms that would experience reductions and fail to meet the BRE recommended level are bedrooms, nine of which would only experience a reduction of between 0.1% and 0.2% ADF. The remaining five of these rooms do not reach the BRE recommended levels for ADF in the existing scenario, which is due to these rooms only enjoying light from one small window positioned in the corner of the room.

10.373 The remaining 13 affected rooms that experience reductions and fail to meet the BRE recommended level are living rooms that are located underneath deep deck balconies which limits the daylight within the room. Of these affected rooms, four would experience reductions of between 20 %-30 % (minor adverse), five would experience reductions of between 30 %-40 % (moderate adverse) and three would experience reductions of between 40%+ (major adverse).

10.374 Overall, the effect on daylight to this proposed residential property is considered to be **Minor to Moderate Adverse** (not significant/significant). This is due to low existing light levels expected within this consented building owing to the inclusion of deep deck balconies into the design of the consented scheme.

Sunlight to Surrounding Receptors

10.375 The full cumulative sunlight assessment is presented within Technical Appendix 10.3 and is summarised in Table 10.13.

10.376 There would be no noticeable reductions in sunlight with the cumulative schemes and proposed development in place in comparison to the proposed development in isolation and therefore no cumulative sunlight effects are predicted.

Table 10.13: Summary of Cumulative Sunlight Effects

Address	Cumulative		Proposed Development	
	Total No. Windows	Meet BRE Guidelines Total & Winter	Total No. Windows	Meet BRE Guidelines Total & Winter
69-78 Juniper Crescent	27	27	27	27
79 Juniper Crescent	4	4	4	4
80 Juniper Crescent	4	4	4	4
81 Juniper Crescent	4	4	4	4
82 Juniper Crescent	4	4	4	4
83 Juniper Crescent	4	3	4	3
84 Juniper Crescent	4	1	4	1
85-92 Juniper Crescent	16	16	16	16
93-100 Juniper Crescent	16	15	16	15
101 Juniper Crescent	4	4	4	4
102 Juniper Crescent	4	4	4	4
103 Juniper Crescent	4	4	4	4
104 Juniper Crescent	4	3	4	3
105 Juniper Crescent	4	4	4	4
106 Juniper Crescent	4	4	4	4
107 Juniper Crescent	4	4	4	4
108 Juniper Crescent	4	4	4	4
109 Juniper Crescent	6	6	6	6
110 Juniper Crescent	11	11	11	11
90 Camden Lock Place	12	10	12	10
51 Chalk Farm Road	2	2	2	2
52 Chalk Farm Road	2	2	2	2
52a Chalk Farm Road	2	2	2	2
55 Chalk Farm Road	4	4	4	4
57a Chalk Farm Road	5	5	5	5
Total	**159**	**151**	**159**	**151**

Overshadowing

10.377 The full cumulative Transient Overshadowing assessment is presented within Technical Appendix 10.3 and is summarised below.

10.378 Taking the cumulative schemes into consideration, the instances of transient shadow on the surrounding areas of amenity remain unchanged from those reported for the development in isolation. The effects of overshadowing remain **Minor Adverse** (not significant).

10.379 The full Sun Hours on Ground assessment is presented within Appendix 10.3 and is summarised below.

10.380 Taking the cumulative schemes into consideration, the instances of shadow on private amenities areas on Juniper Crescent remain unchanged from those reported for the proposed development in isolation. The effects of overshadowing remain **Minor Adverse** (not significant).

Solar Glare

10.381 A cumulative solar glare assessment is not considered necessary as the cumulative schemes can obscure the potential solar reflections from the proposed development. For this reason the Solar Glare assessments have been undertaken in the proposed development scenario only as this is considered to represent the worst case condition.

Light Pollution

10.382 The full Light Pollution assessment is presented within Appendix 10.5. This assessment considers the light trespass pre- and post-curfew on the cumulative surrounding sensitive receptors at 100 Chalk Farm Road which is in close proximity of the PFS block. The results of the assessment indicate the pre-curfew levels of light trespass will be within 25 lux suggested by the ILP for all of the sensitive properties assessed. However, with regard to post-curfew levels of light trespass areas of the balcony windows in four flats of the surrounding sensitive properties assessed would experience adverse effects.

10.383 No other commercial premises within this development is believed to cause light pollution given the distance to any sensitive receptor.

10.384 In regards to post-curfew, the levels of light trespass exceeding the ILP's threshold of 5 lux occur on the eastern elevation of the consented 100 Chalk Farm Road, facing the proposed PFS office building. Two windows would experience levels of lux ranging between 2.5 and 7.5 lux.

10.385 However, the light trespass in excess of the 5 Lux recommended by the ILP guidance only occurs in a small portion of each of the four windows. In addition to this, the assessment assumes a worst case scenario whereby the office is fully occupied and lit after 11 pm. However, it is unlikely that this would be the case.

10.386 Overall, the light pollution effect on the surrounding sensitive properties is considered to be **Minor Adverse** and therefore not significant.

Summary

Demolition and Construction

10.387 The potential daylight, sunlight, overshadowing solar glare and light pollution effects during demolition and construction would gradually increase in magnitude as the massing of the proposed development increases. When considering the construction of the proposed development, the effects would be noticeable; however, such effects would be less than that of the completed development.

Completed Development

10.388 The daylight, sunlight and overshadowing assessments have been undertaken by reference to the BRE Guidelines and for all of the sensitive receptors surrounding the application site.

10.389 To assess the surrounding existing properties, the BRE Guidelines provide two main methods for assessing daylight: 'Vertical Sky Component' (VSC) and 'No Sky Line' (NSL). The VSC method measures the amount of light available on a vertical wall or window following the introduction of barriers such as buildings. The NSL method is a measure of the distribution of daylight at the 'working plane' within a room (i.e. a horizontal 'desktop' plane of 0.85 m in height). The NSL divides those areas of working plane in a room which receive direct sky light through the windows from those areas of the working plane which cannot. Where all of the windows meet the VSC and all of the rooms meet the NSL criteria within a property the effect is considered to be negligible.

10.390 For the assessment of sunlight, the approach considers the 'Annual Probable Sunlight Hours' (APSH) for a reference point on a window (i.e. if a window point can receive at least 25% APSH, then the room should still receive enough sunlight). Windows are checked if see if they are facing 90° due south, with the emphasis on main living rooms and other rooms such as the kitchen and bedrooms being is less importance.

10.391 For daylight in the baseline condition, 345 (95 %) out of the 365 windows assessed for VSC and 271 (98 %) of the 291 rooms assessed for NSL meet the BRE criteria for daylight. For sunlight, 149 (98 %) of the 159 rooms assessed meet the BRE criteria for sunlight.

10.392 The results of the baseline assessment indicate very high levels of BRE compliance for daylight and sunlight when taking the urban location of the application site into consideration. These high levels of daylight and sunlight are unusual for the urban context of the application site owing to the current low level massing of the application site allowing the surrounding residents to benefit from daylight and sunlight levels that are not consistent with the urban location of the application site.

10.393 Owing to the current low level massing on the application site, the overshadowing baseline condition shows minimal shadow is cast from the existing buildings on to the surrounding areas of open space and the surrounding sensitive amenity areas are unaffected by shadow cast from the existing buildings on site on the days assessed.

Daylight

10.394 For daylight, of the 365 windows assessed for VSC 127 (35%) would meet the BRE criteria and 141 (48%) of the 291 rooms assessed for NSL would meet the BRE criteria. 12 of the 33 sensitive receptors assessed for daylight would experience negligible to minor adverse effects to daylight. There are seven instances of minor to moderate adverse effects, one instance of moderate adverse effects and two instances of moderate to major adverse effects which are considered to be significant effects. The two most affected buildings are Gilbeys Yard (Block A), Gilbeys Yard (Block B); however the majority of the affected rooms are kitchens and bedrooms which are not considered as sensitive to daylight as living rooms. During the design process measures were implemented to minimise the impacts on daylight to surrounding sensitive receptors as much as possible while still ensuring the provision of a viable scheme and therefore no additional mitigation is considered available.

10.395 Although significant daylight effects are predicted at several of the surrounding sensitive receptors, given that the application site is in an urban location, the current levels of daylight and sunlight cannot be expected to be maintained, and the expectation of daylight amenity in this area is likely to be lower. The existing site is currently considered to have a low level massing, owing to this significant effects are likely to be unavoidable in relation to any substantial and viable new development proposed on the application site.

10.396 It must be taken into consideration that the surrounding sensitive receptors currently see unrealistically high levels of daylight that are not consistent with the levels usually seen within an urban location. Any massing proposed on the application site that would exceed the parameters of the existing massing currently on site would result in disproportionate percentage alterations in the daylight levels experienced by the nearby sensitive receptors. As emphasised within the Housing SPG (2016) for London, an appropriate degree of flexibility should be applied when using the BRE guidelines and factors such as local circumstances and the need to optimise housing capacity should be taken in to consideration.

10.397 A standalone 'Contextual Density and Daylight Research' report has been carried out alongside the daylight and sunlight analysis for this chapter. Although the proposed development is predicted to result in moderate to major adverse effects in terms of daylight and sunlight these should be considered in the urban context of Camden Town Centre and Camden Borough as a whole. The standalone research report draws comparisons with existing daylight levels in the area as well as those of nearby consented scheme. Owing to this research the reported significant effects are not considered to be material considerations in the overall planning balance.

Sunlight

10.398 In relation to sunlight, 151 (95%) of the 159 windows assessed would meet the BRE criteria for both total and winter APSH. All of the buildings assessed for sunlight would experience negligible to minor adverse effects and no significant effects are considered likely. Due to the minor nature of the overall effects on sunlight to surrounding sensitive receptors, no mitigation is considered necessary.

Overshadowing

10.399 For both transient overshadowing and sun hours on ground, whilst the proposed development would result in an increase in levels of overshadowing in the area surrounding the application site, this would not significantly affect any of the sensitive amenity areas nearby.

10.400

Solar Glare

10.401 In relation to solar glare the majority of viewpoints assessed would experience negligible to minor adverse effects, however eight of the viewpoints assessed would experience major adverse effects. These significant effects will be mitigated at the detailed design stage by the inclusion of effective mitigation measures such as fins/louvres on the facades closest to the road and rail viewpoints.

Cumulative effects

10.402 For daylight within the cumulative scenario, the majority of properties/buildings assessed would not experience any adverse cumulative effects. The potential adverse cumulative effects to the eight buildings/properties that would experience noticeable alterations are caused by the cumulative scheme 100, 100a, 100b Chalk Farm Road rather than the proposed development in isolation.

10.403 There are no adverse cumulative sunlight or overshadowing effects predicted with the proposed development and cumulative schemes in place in addition to those effects already predicted for the proposed development in isolation.

10.404 The Light Pollution assessments show that the proposed PFS office building would have a minor adverse effect upon the consented scheme on 100 Chalk Farm Road which is not considered significant.